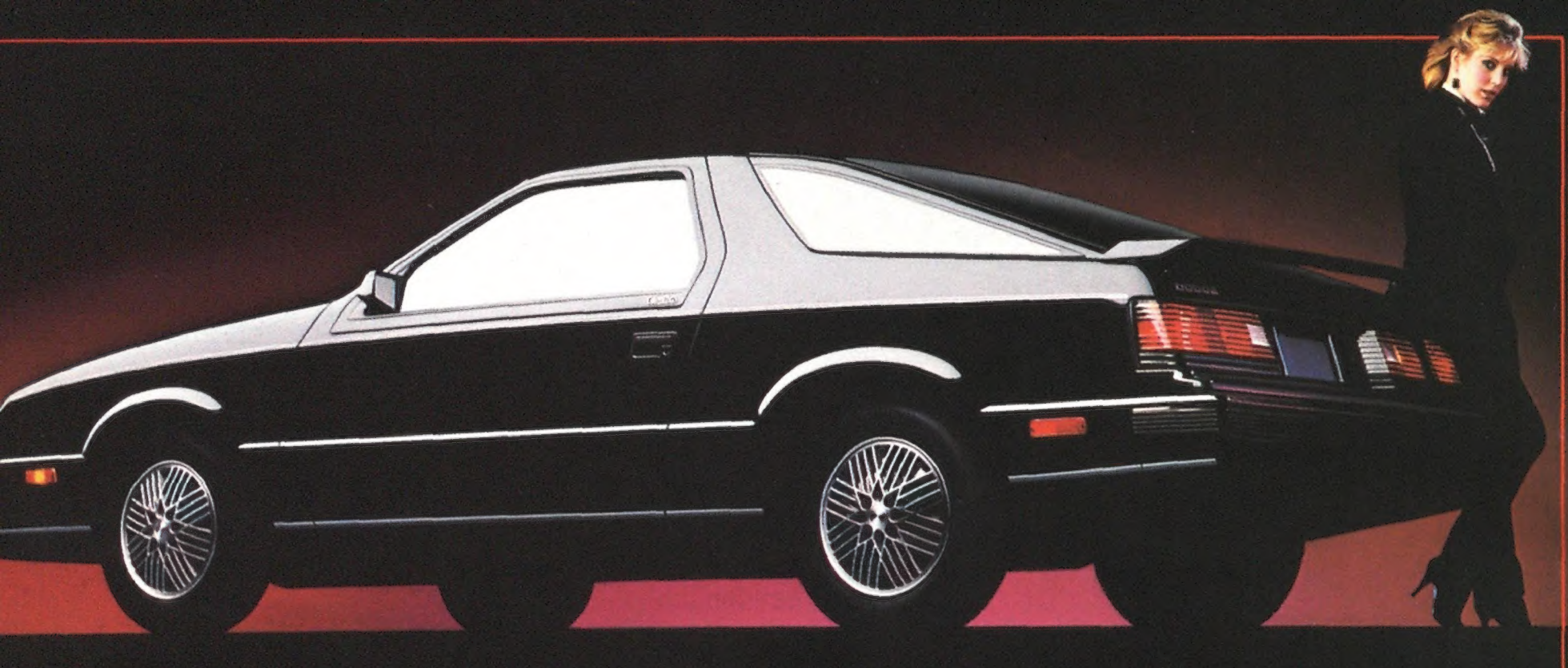
Smithsonian

August 1984

Mountain goat nanny and kid thrive in Olympic Mountains, but threaten the wilderness (p. 102)



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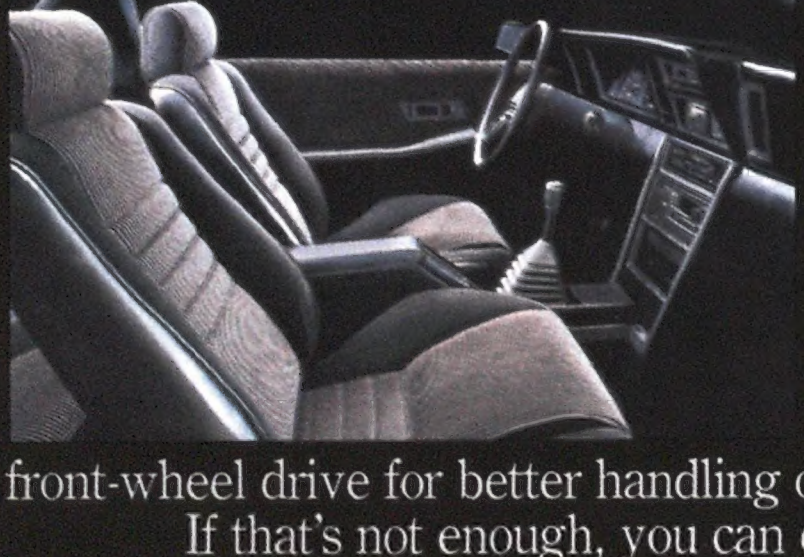

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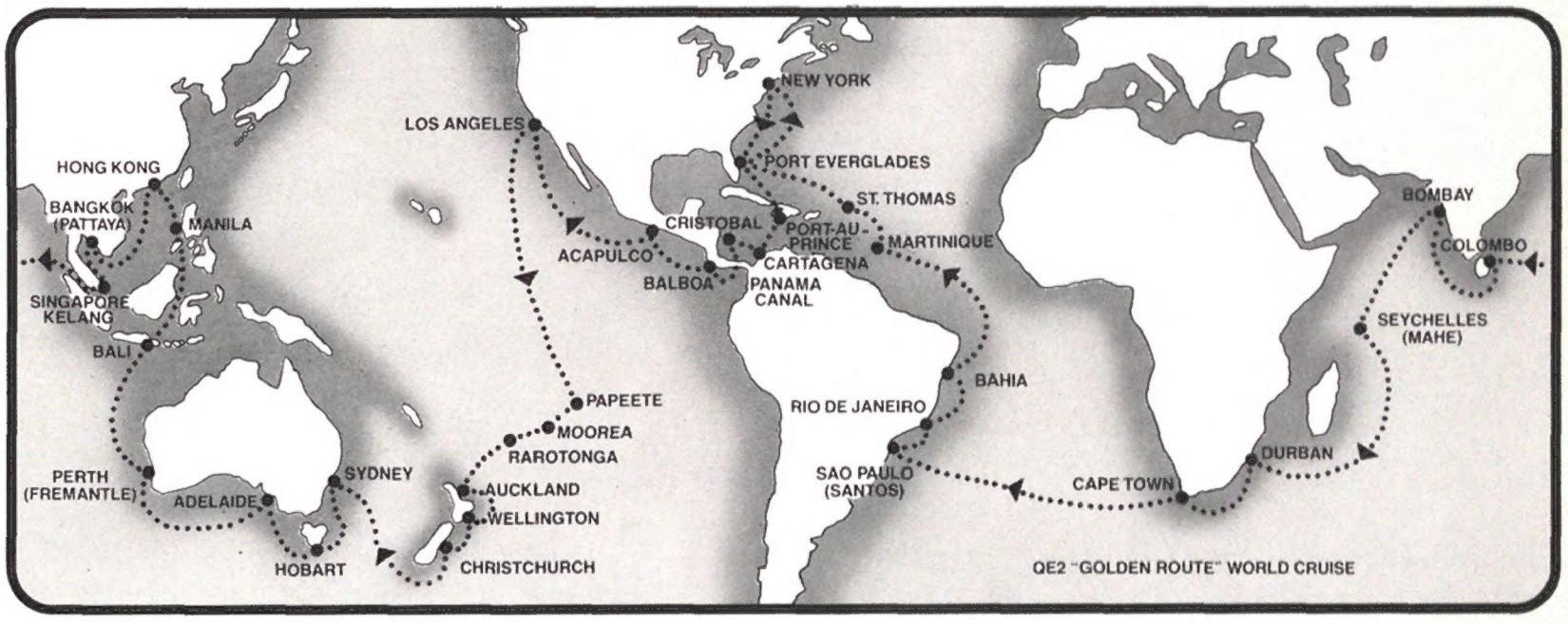

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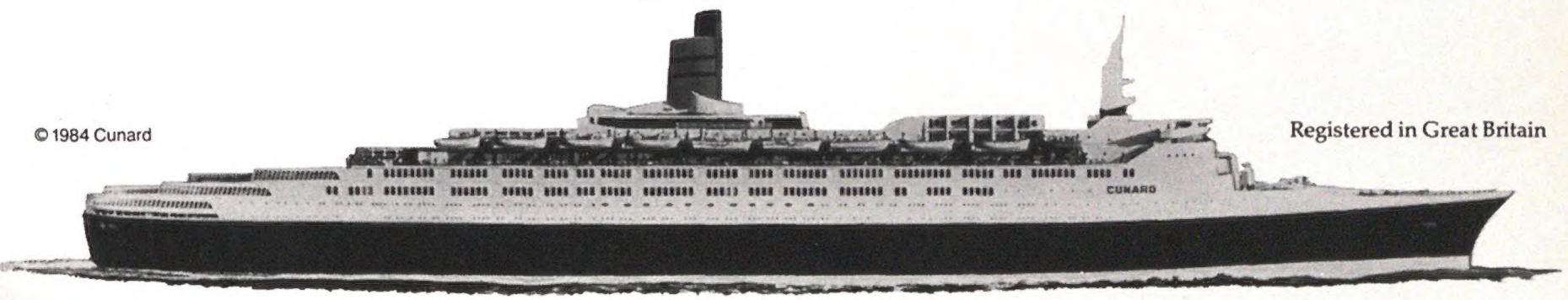

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August 1984

Smithsonian

Volume 15, Number 5

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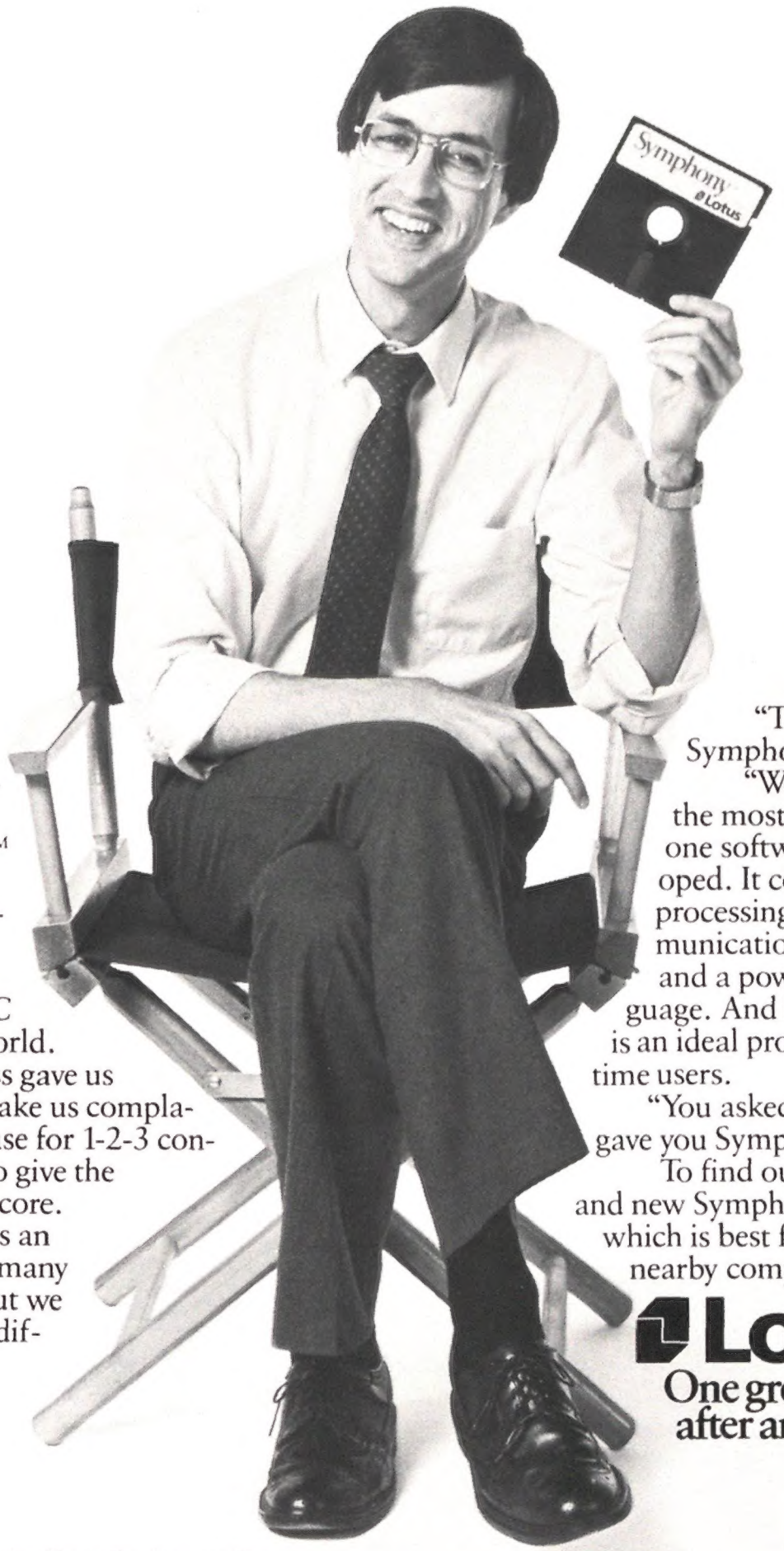

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While far from record prices (dolls have brought in excess of $38,000), these episodes point up the sky-rocketing interest in dolls.

The Aristocrats of Dolls and Music

Of all dolls, porcelain dolls are the aristocracy. They have the greatest detail. They last the longest. Ultimately they have the most value.

Music boxes, similarly, have soared not only in value but in popular demand. Music box makers have trouble meeting the quotas they allocate to eager buyers. When an old music box comes up at auction, it brings a fabulous price. A simple old Polyphone box, which sold for "novelty" prices a few years ago, now lists for more than $3,200.

As the Mary Anne figure rotates, a little girl and her doll are revealed. The doll is two-sided. No batteries or keys—turn the inner base to wind "Mary Anne," then watch her graceful turning as the music plays.

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Adding to the uniqueness of "Mary Anne" is the music itself. The melody never has been heard in a musical movement; the gentle tones of the beautiful song are *only* in this one limited edition Musical Doll.

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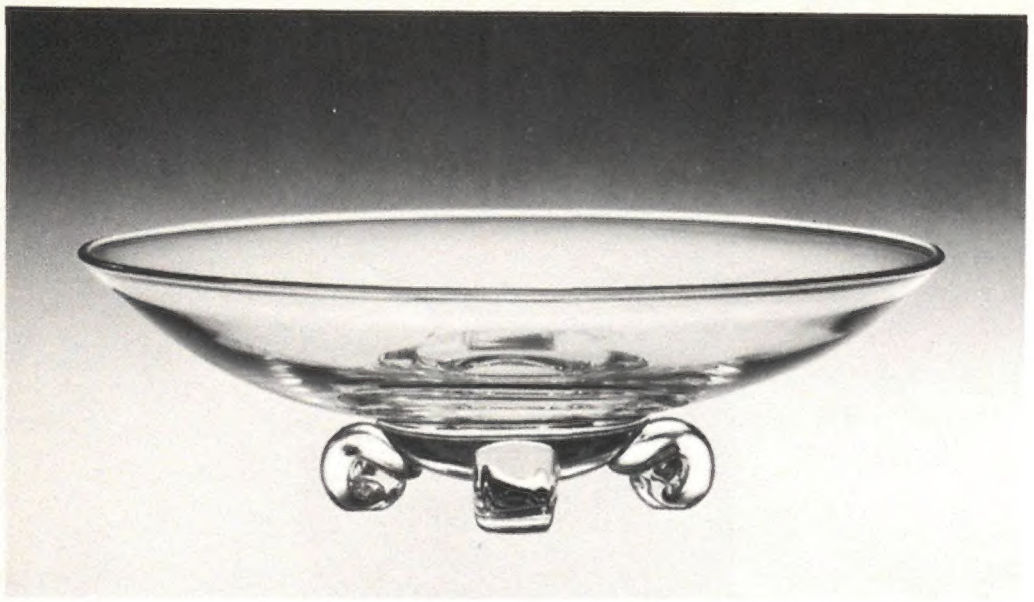

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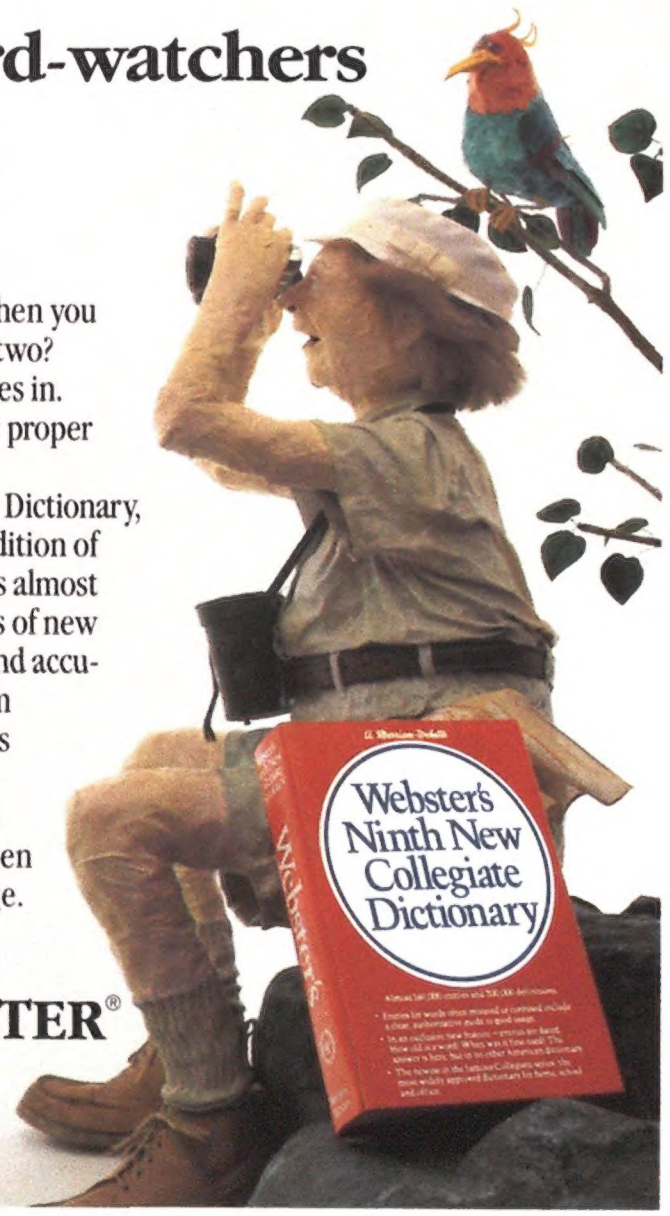

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Secretary Ripley's comments

The view from the castle

The Smithsonian—as most cultural institutions —can survive only as a partnership between private endowment and governmental support

In this month of August 200 years ago James Smithson, on a tour of the Scottish highlands, may have had prescient thoughts of the future. Surely 200 years later his Institution has reached an apogee of "increase & diffusion of Knowledge among men" in a variety of ways.

Twenty years ago we were preparing for a 200th anniversary, in this case of the birth of our founder, Mr. Smithson himself. Delegates from more than 90 nations throughout the scholarly world had been invited to convene upon the Mall and to discuss the meaning of "Knowledge among men." That conference and the celebrations attendant upon it marked the beginning of a new era of public understanding.

The Institution has meant many things to many people over the 138 years since its founding. Its Congressional sponsors envisioned a library, an art gallery, a museum. Joseph Henry—the first Secretary—felt that the Smithsonian should rather serve as a nerve center, acquainting literary and scientific institutions around the world with the publications in science, history and art being produced in this vibrant new nation.

Over the ensuing years the Institution has had its ups and downs. At first it was expected to exist on income from the Smithson bequest, but Congress eventually began an annual subvention to keep the buildings open to the public. By the 1890s as little as 12 percent of the annual budget came from private trust sources, the rest from government.

There is always a danger to an institution in such domination. But it was not until the 1920s that the then Secretary, Charles D. Walcott, had the vision to look outward to the world of business and the new foundations then arising to seek to undergird the original endowment with an infusion of private funds. Unfortunately, just as Walcott was embarking on what we would describe as a modern college endowment fund drive, he suffered a stroke while attending a scientific meeting and died a few days later.

More recently the Smithsonian has been able to revive old beliefs that scholarship and research can march hand in hand with public enlightenment and that high standards of scholarship can be maintained outside university cloisters. Along with this has come a welcome return to another ideal, that funds from our private sources should work together with annually appropriated funds. Thus Secretary Walcott's dream of past years is reconstituted.

But there are gaps in this vision. As an example, in 1958 Congress created a new national cultural center, now the John F. Kennedy Center for the Performing Arts. It was set up as an independent bureau of the Smithsonian, but apparently with the assumption that little further responsibility need be taken.

Just as the Smithsonian itself exists as a successful and needed marriage between government patrimony and private endowment, so the Kennedy Center can only exist as a partnership between the creativity and imagination of private initiative and the conscious beneficence of our federal enterprise.

The American body politic aspires to improvement and cultural enlightenment and benefit. Let all concerned citizens support this concept for our intellectual and cultural survival.

S. Dillon Ripley

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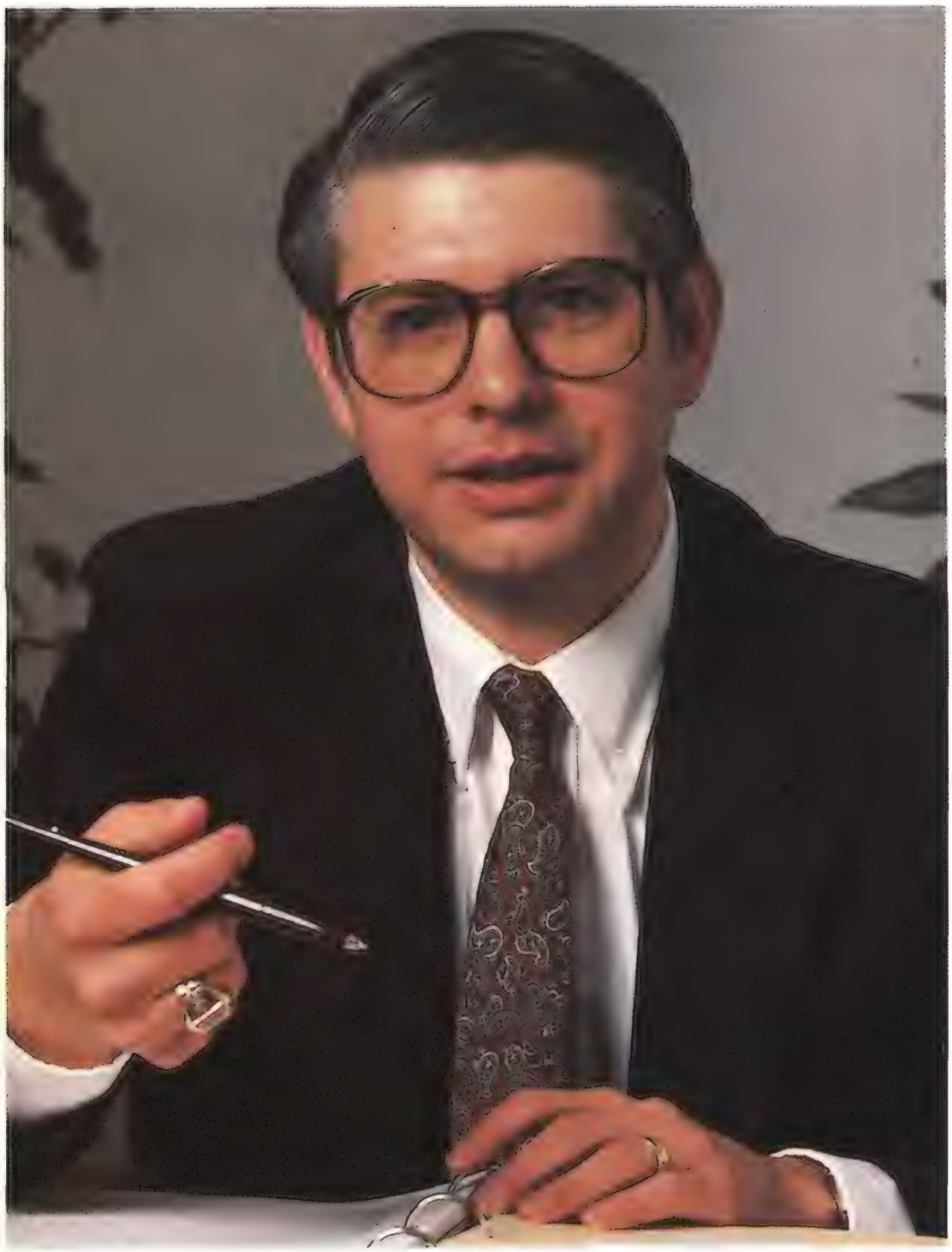

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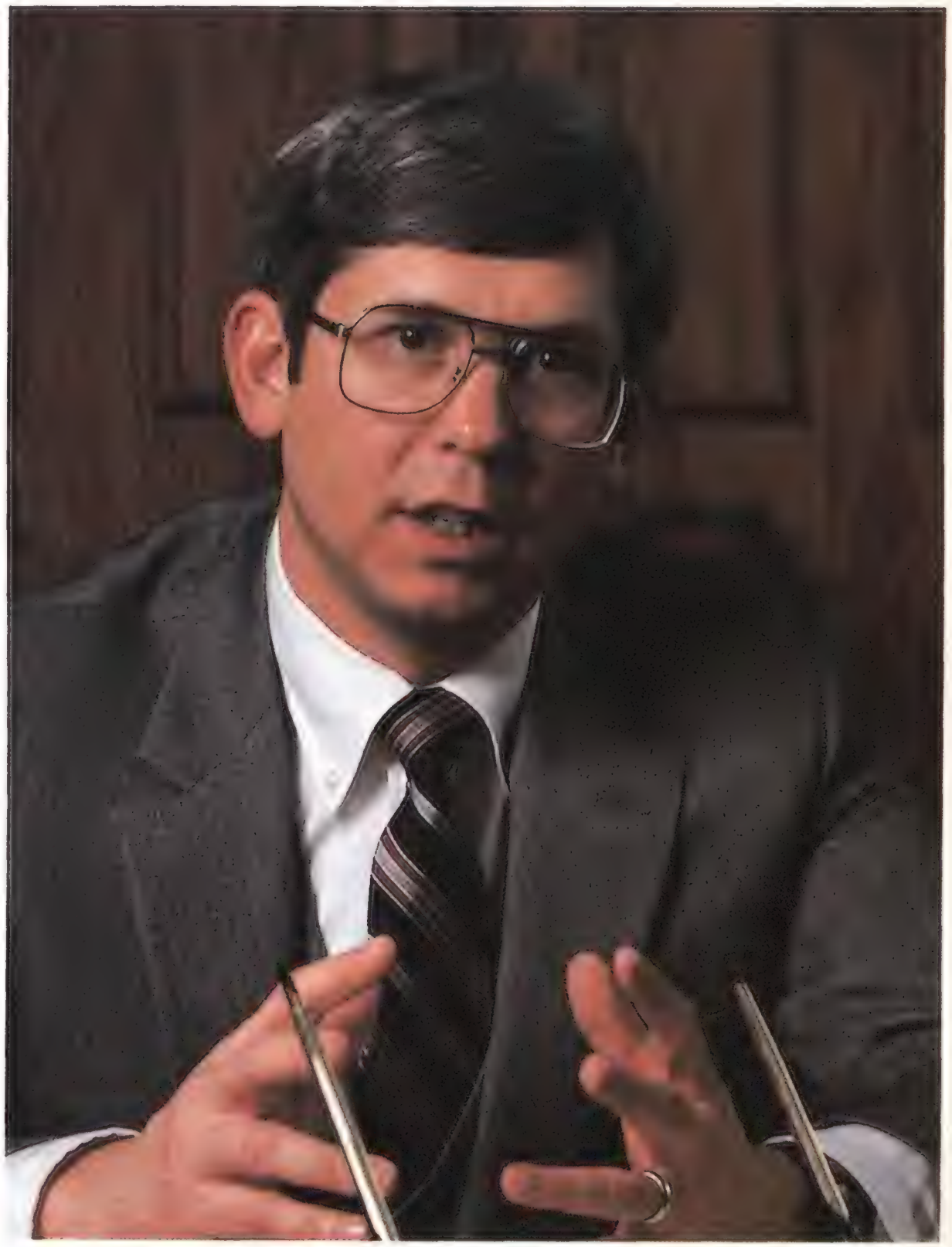

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Letters to the Editor

The Olympics

Dear Sir: Referring to your June article on the Olympics, on one occasion they were not held in an Olympic year. The 211th games were postponed two years, to A.D. 67, so Roman Emperor Nero would have a chance to compete. He did so, with predictable success, even though he fell out of his chariot during the race and had to be picked up. He did not finish the course, but was proclaimed victor nonetheless—one of six victories awarded him. But after his death, the records were erased and the judges had to give up the wealth they had received for their favorable judgments.

The earliest Olympics may not have had events for women athletes, but there was a "women's Olympics," dedicated to Hera, sister and wife of Zeus, the god to whom the Olympics were dedicated. The games of Heraea were held every four years and included a race for maidens, run in the same Olympic stadium used by the men. The girls ran in what amounted to a minidress with one shoulder and one breast bare.

The first recorded winner, so the legend goes, was Chloris, the only surviving daughter of that Niobe mentioned in Curt Suplee's article on weeping, in your same issue. Incidentally, the statue on page 105 is not Niobe, but one of her daughters, stricken by Artemis' arrow to punish Niobe.

Mario Rups
Fairfax, Virginia

The mystery of tears

Dear Sir: Curt Suplee points out that as yet nobody knows for sure why people

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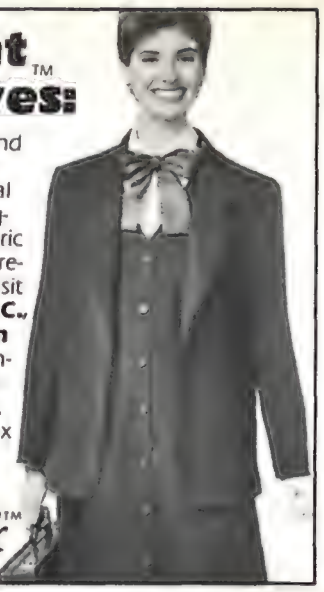

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The Franklin Gallery
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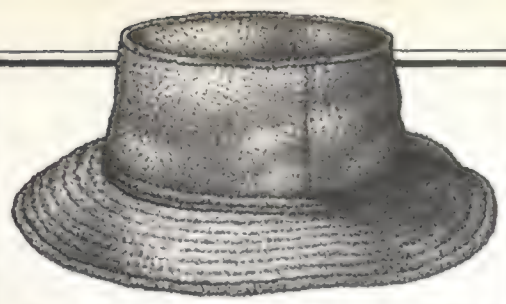

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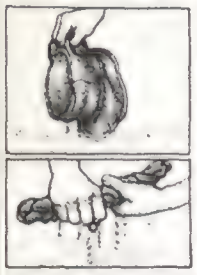

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weep, or precisely of what tears consist.

James Smithson, the distinguished English scientist who left his money to the United States to found the Smithsonian Institution was, among other things, a chemist—in the 18th century, at the dawn of chemistry. Prominent chemist Sir Davies Gilbert referred to Smithson's analytical skills as demonstrated in an address to the Royal Society, of which both men were Fellows:

"Mr. Smithson declared that, happening to observe a tear gliding down a lady's cheek, he endeavored to catch it on a crystal vessel; that one-half of the drop escaped, but having preserved the other half he submitted it to reagents, and detected what was then called microcosmic salt, with muriate of soda, and, I think, three or four more saline substances, held in solution."

Sadly, we do not know more of the substances which Smithson attempted to analyze in his fraction of a lady's tear.
S. Dillon Ripley, Secretary
Smithsonian Institution

Dear Sir: Elizabeth Barrett Browning had her own version of the reason for tears, in her poem "Aurora Leigh": "Tears, tears! *why*, we weep?/ 'Tis worth enquiry?—That we've shamed a life,/ Or lost a love, or missed a world, perhaps?/ By no means. Simply, that we've walked too far,/ Or talked too much, or felt the wind i' the east. . . ."
Mrs. F. W. Laverty
Alma, Kansas

Dear Sir: As a counselor for both male and female clients, I have discerned that men who freely express their emotions through the shedding of tears are more sensitive to the feelings of women and children. The first Bible verse I learned as a child was "Jesus wept." If my Lord can weep, then so can my man.
Jo T. Silva
Norfolk, Virginia

Dear Sir: Scott Hamilton was not hiding his eyes in shame, but was wiping away tears of joy after winning his Gold Medal.
M. A. Ealy, M.D.
West Covina, California

Toe shoes

Dear Sir: I must take issue with Toni Bentley's ranking photographs of Oriental dancers ("belly dancers" are her words) on a level with "pinups" and "provocative calendar art."

As an Oriental dancer I find it appalling that another artist, a sister in dance, should show such lack of knowledge and respect for what is probably the oldest dance form.
Lyn M. Anton
Lancaster, Pennsylvania

Dear Sir: Your article does not take into account other leading toe shoe manufacturers, including our own Gamba and your American Capezio.

Until 1908 all toe shoes were made entirely by hand. Today all manufacturers use the basic method of machine sewing of soles and certain other features initiated by my grandfather.

As the result of research done a year or so ago by Gamba and Rodney Freed (son of Frederick but not associated with Freed of London), it is no longer true that a new pair of toe shoes has to be considered an enemy to be tamed. Our Turning Pointe shoes' advantages include great durability, a solution to the age-old high arch fitting problem and, above all, comfort and performance. Alesandra Ferri of the Royal Ballet took on tour from London to Eastern Europe only one pair of Turning Pointes, which she had worn daily for a month. To her surprise, she had to have a replacement—one pair—rushed to her two weeks into the tour.
Michael Gamba, Chairman
Gamba Ltd.
London

Smedley Butler

Dear Sir: General Smedley Butler's own summation of his career, as he wrote it in the November 1935 *Common Sense*, is an interesting addendum:

"I spent thirty-three years and four months in active service as a member of our country's most agile military force—the Marine Corps. . . . And during that period I spent most of my time being a high-class muscle man for Big Business, for Wall Street and for the Bankers. In short, I was a racketeer for capitalism. . . .

"Thus I helped make Mexico and especially Tampico safe for American oil interests in 1914. I helped make Haiti and Cuba a decent place for the National City Bank boys to collect revenues in. . . . I helped purify Nicaragua for the interna-

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tional banking house of Brown Brothers in 1909-1912. I brought light to the Dominican Republic for American sugar interests in 1916. I helped make Honduras 'right' for American fruit companies in 1903. In China in 1927 I helped see to it that Standard Oil went its way unmolested."
Edgar P. Wyman
North Sandwich, New Hampshire

Pennsylvania veterinary school

Dear Sir: I was startled by the picture of Dr. Mark Haskins on page 84. Due to photographer Louis Psihoyos' placement of a lamp, Dr. Haskins was transformed into a "Christus" figure. I found this portrayal most unusual and appealing.
Mary Anne Costin-Sizer
St. Clair Shores, Michigan

Dear Sir: Jesus Christ Haskins complete with halo? Suffer the little animals to come unto me? This full-page photograph is in very poor taste.
Mrs. Frank W. Beatty jr.
Bellevue, Washington

Phenomena

Dear Sir: As to animal sense of humor: when my daughters were very small, a neighbor moved away and gave us her pet parrot. It soon learned to mock me and the children. If I was busy upstairs it would scream in a terrified child's voice: "Mooothhher, come quick!" as though someone was in serious trouble. I would dash down, only to find that all was peaceful. The parrot then burst into a raucous "Ha, ha, ha, ha, ha!" Many a time I could have wrung its neck.
Caryl C. Bradford
Arcadia, California

Dear Sir: After a long succession of canine and feline housemates, I have come to agree with Michel de Montaigne: "Presumption is our natural and original malady. When I play with my cat, who knows if I am not a pastime to her more than she is to me."
William L. Lillibridge
Iowa City

Mall

Dear Sir: It sounds to me as though Edwards Park was an infantryman at Ver-

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dun in World War I. I was nearby in 1918, fighting from Château-Thierry to Fismes and then at Juvigny. Oddly enough, I can't remember any rain or mud or how often we went without meals. I can remember a soldier right next to me who finished his breakfast and then shot himself in the foot. We were going into combat in an hour or so.

Everett Oertel
Baton Rouge

Mr. Park entered this world too late for World War I, but he made it to the Pacific as a fighter pilot in World War II and says the reason he took that job was to get away from Verdun-type mud. And that he didn't have the chance—nor the courage—to shoot himself in the foot. Ed.

Letters

Dear Sir: Let Mr. Shoemaker, who wonders about words in the "negative form," be advised that several years ago I pondered and wrote down the following positives: Do unmitigated liars ever go through a mitigated stage? Only intrepid, not trepid, acts are recorded. Peccable or maculate dressers seldom receive attention; also ignored are the kempt. We meet numerous nonchalant people without ever bumping into a single chalant.

Maxwell Scarf
Philadelphia

Dear Sir: In her delightfully offbeat *Scrap Irony,* Felicia Lamport avers that "the time has come to spring to ertia and effect the birth of a de-negation." To wit: "Many a new little life is begot/ By the hibited man with the promptu plot." I trust this helps make you ritable though you may remain no less formed.

Larry Keesler
Mount Airy, North Carolina

We admire the sipience in your solent nuendo. Ed.

Dear Sir: I have made a minor hobby of collecting lost positives: indignant/ dignant, insipid/ sipid, dismayed/mayed, indigent/digent, inane/ane, indomitable/ domitable. But my two favorites are ept and, above all, ert.

Raymond Graunke
Clearwater, Florida

Dear Sir: Note should be taken of that rarest of all birds: the gruntled employee.

Jay L. Wilensky
Clifton, New Jersey

Before you say 11^{50} is too much to pay for these Lands' End socks, remember: *quality like this comes only from France.*

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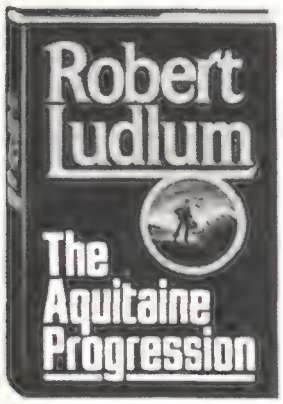

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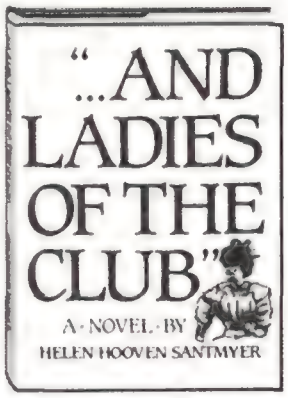

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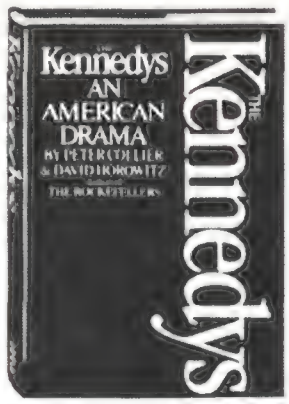

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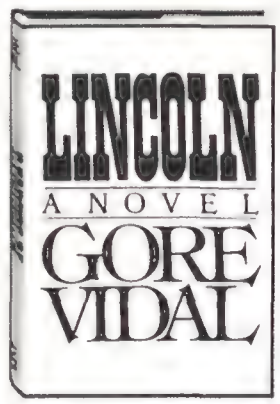

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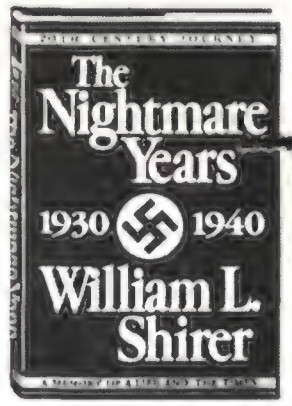

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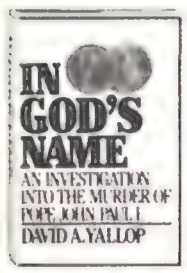

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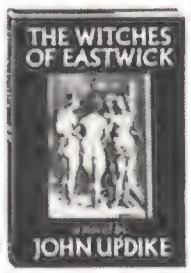

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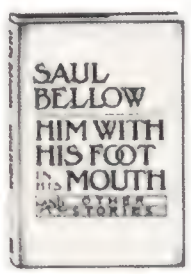

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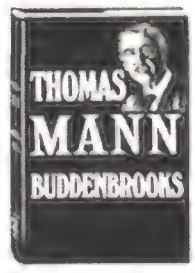

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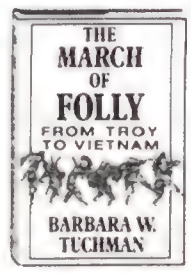

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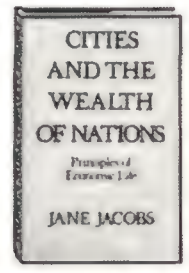

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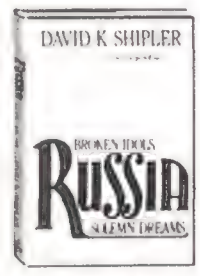

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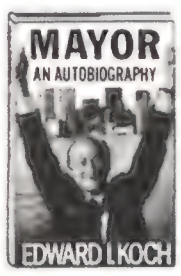

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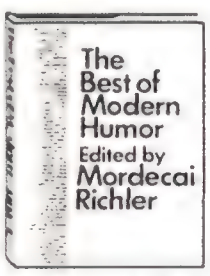

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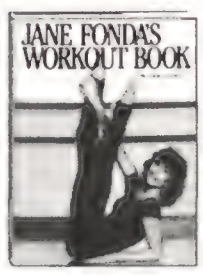

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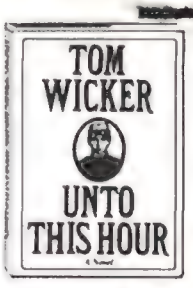

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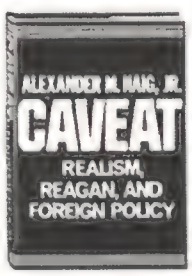

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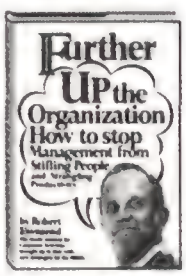

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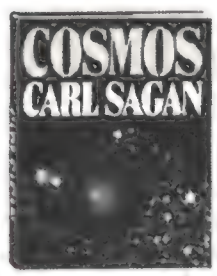

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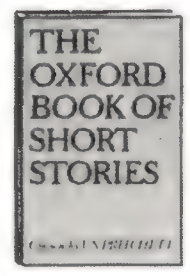

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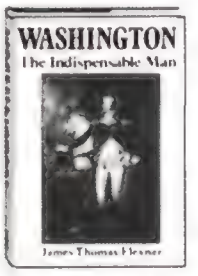

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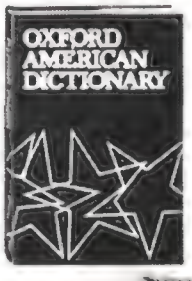

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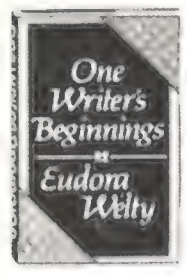

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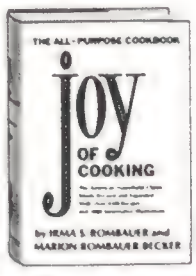

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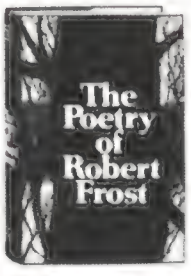

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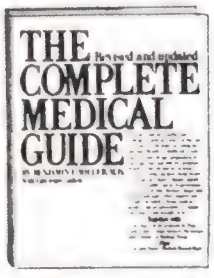

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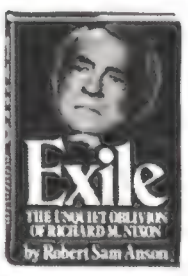

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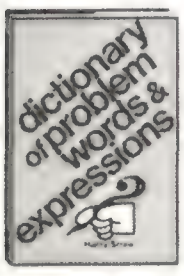

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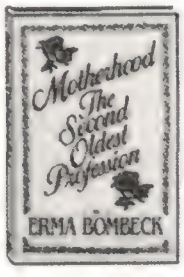

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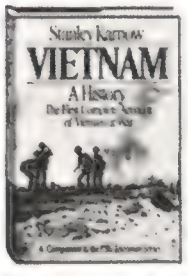

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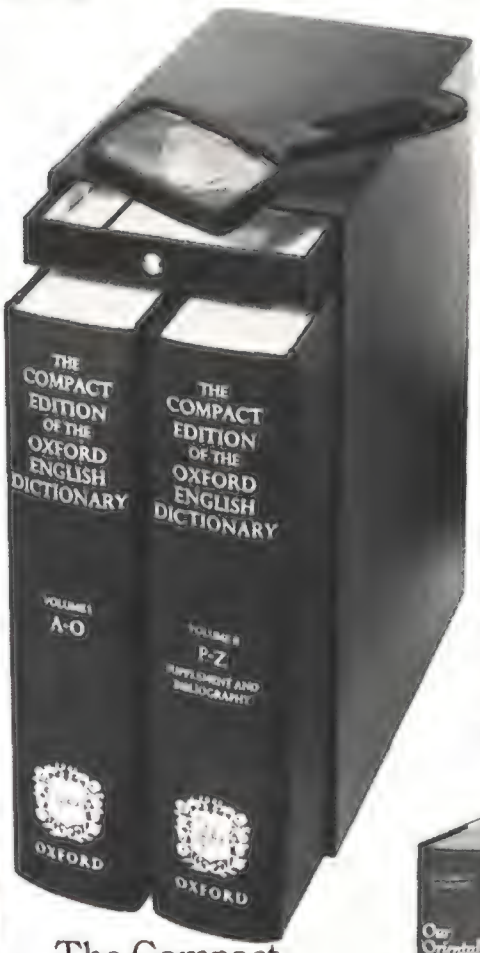

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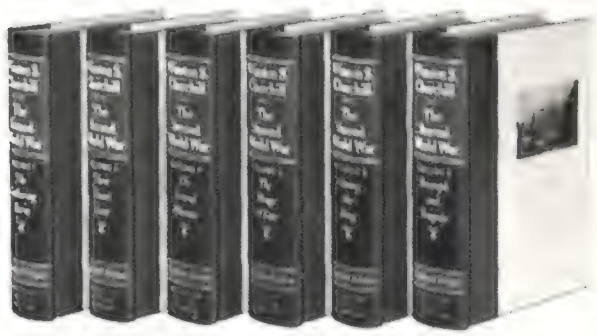

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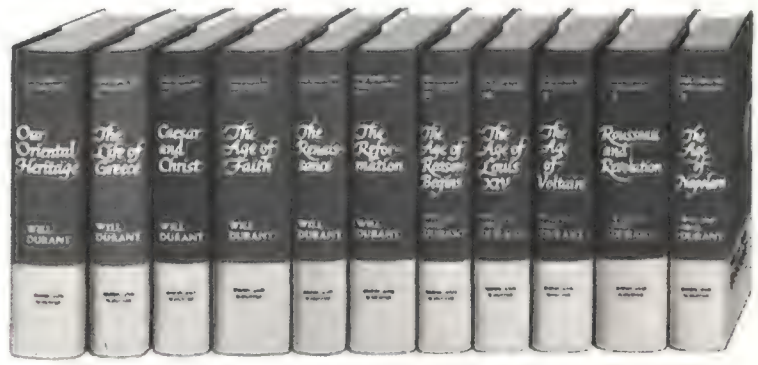

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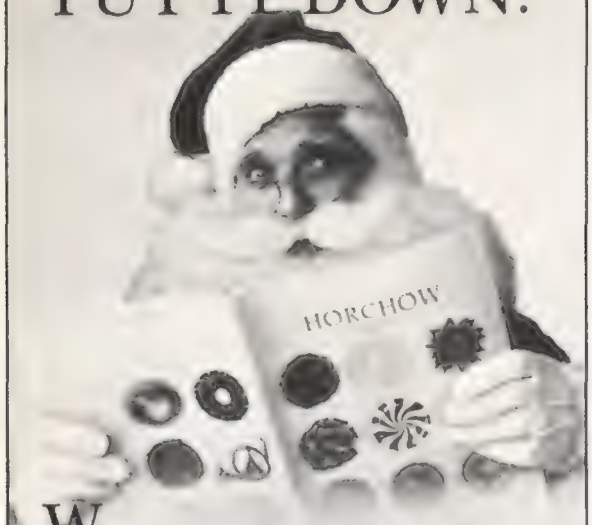

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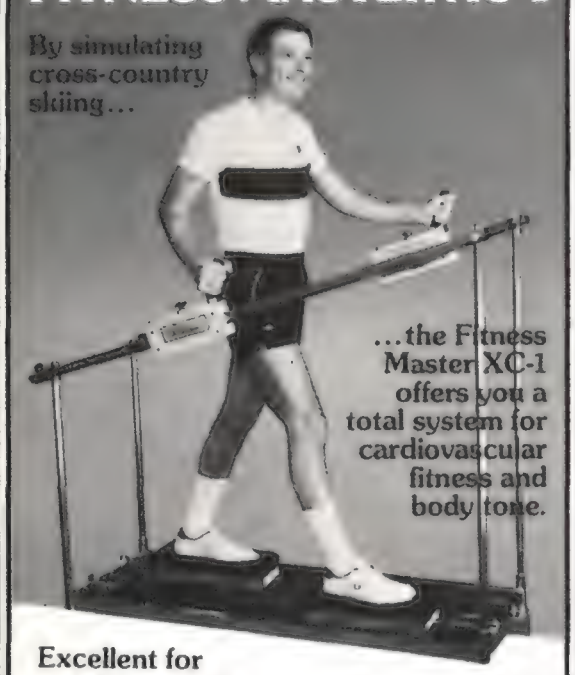
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Around the Mall and beyond

The *Highlights* column of this issue describes the Smithsonian's participation in the Edinburgh International Festival in Scotland. The event is a notable first for the Institution, because we've never before packed up and shipped off an exhibition representing so many of the Smithsonian museums. SITES (Smithsonian Institution Traveling Exhibition Service) has been sending displays to distant cities for 30 years or more, but never one which contained such a broad range of objects and works of art from the Institution's collections.

Having myself been packed up and fired off overseas on various assignments, I am fully aware of the discomforts involved—which increase with the speed and efficiency of the conveyance. But if the human body, with all its resilience, emerges wracked, aching, overfed and underslept from hours of imprisonment in an airline seat, what happens to, let's say, a delicate model airplane from the Smithsonian which is put in a box and tossed about by freight handlers?

Fired with these thoughts, I ventured over to the Smithsonian Service Center building where the Office of Exhibits Central—a title which I'm afraid I can't explain—was crating things for Edinburgh. Among them was the model of the Lockheed Sirius which Charles and Anne Lindbergh flew "North to the Orient"—that is, reaching Tokyo and China by way of the Arctic—in 1931. In 1933, they flew the Sirius to Europe via Greenland, surveying routes for future airliners. This flight took them to Scotland, among other places. So the event is worth recalling at Edinburgh.

The actual Sirius is at the Air and Space Museum—far too big and awkward to be shipped abroad within the budget. The model is a beauty. It was being fitted into a crate packed with flexible polyurethane

Lora Moran, a model-maker for the Office of Exhibits Central, carves a snug berth for 19th-century eagle weathervane out of flexible foam sheets.

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foam that had been sculptured to fit around the wings and fuselage of the plane. "Cavity packing," it's called.

Dozens of crates cluttered the floor of a huge Service Center room. They seemed to come in an endless variety of sizes, but all were identically painted a luminescent yellow—garish, but unmistakable. All were stenciled "SITES" and marked "Fragile" and bore symbols: outlines of freight handler's hooks crossed with an X, or of umbrellas to indicate the crate should be kept out of the rain.

I watched a crate being made. A young man planed and sanded the wood smoothly, as though he were making living-room furniture, and then drove the screws into the wood with that utter assurance that carpenters all put on when they know they are being watched by a Saturday-morning hacker.

A girl was fitting a sculpture into a specially made crate. It was a 19th-century weathervane in the shape of an eagle on a globe—slightly reminiscent of the U.S. Marine Corps symbol (p. 24). It was copper, I think. Anyway, she had cut layer after layer of polyurethane foam to fit around the wings and globe. Each sheet of foam was about an inch thick, and out of each sheet she had carved an aperture which had to vary in size and shape. The sheet that encircled the widest diameter of the globe had the biggest hole. Then the hole tapered down, in sheet after sheet, to nothing. She did the same thing, with odd and varying shapes, to encompass the spread wings. Intricate work. Before final placement in this cushioned berth, the weathervane will be wrapped in acid-free tissue and plastic film to protect it from the foam.

This weathervane would presumably be displayed on some sort of pedestal at Edinburgh. These, too, were being made nearby—cylinders of compressed paper sheathed in a Masonite material and capped with plywood. Pedestals and most crates were customized so their objects would fit them exactly. Paintings were being set on foamcore and Eathafoam "trays" that would fit into special crates.

Donald McClelland of SITES is the curator and coordinator of the Smithsonian's Edinburgh show, and he and Jim Mahoney and Mary Dillon of Exhibits Central and others will be getting it ready for visitors to see at the Royal Scottish Museum. "Five inches of foam is the

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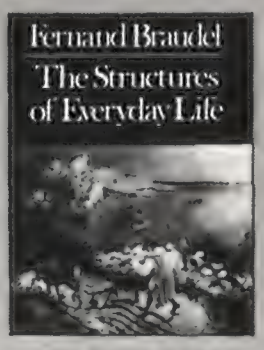

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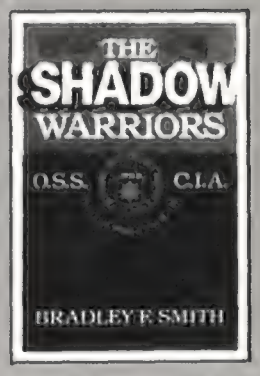

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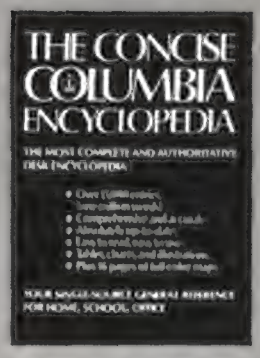

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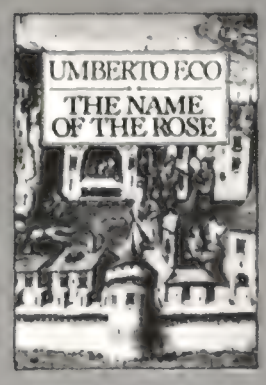

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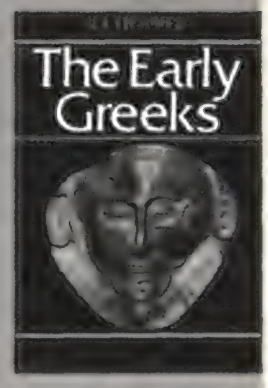

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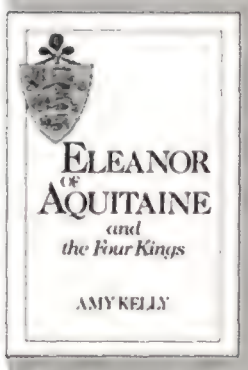

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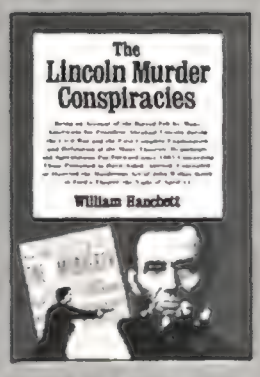

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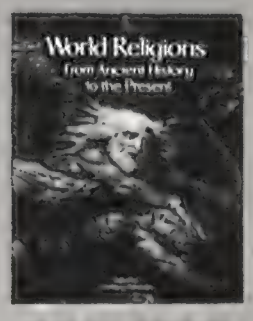

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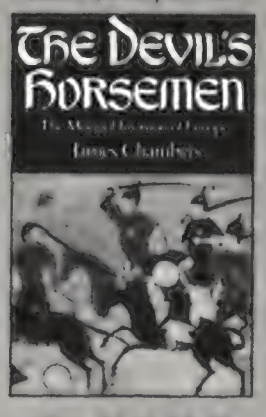

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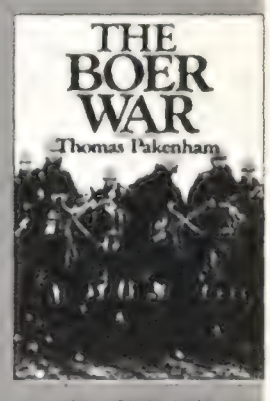

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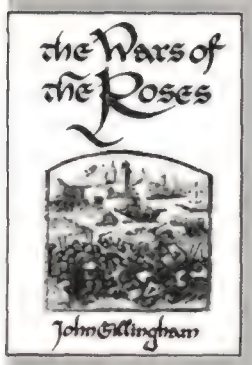

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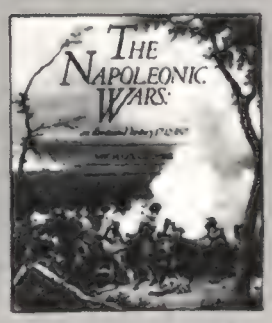

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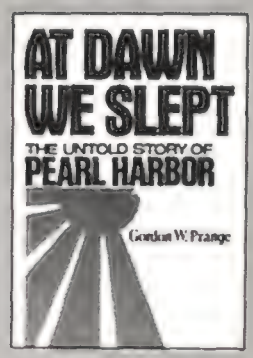

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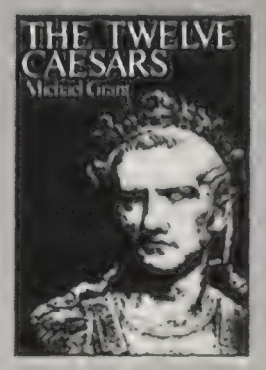

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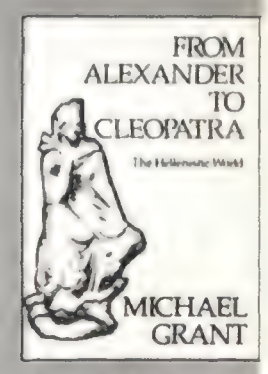

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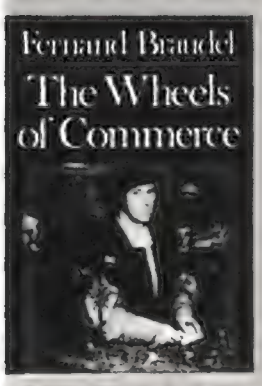

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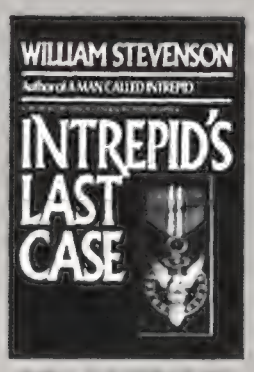

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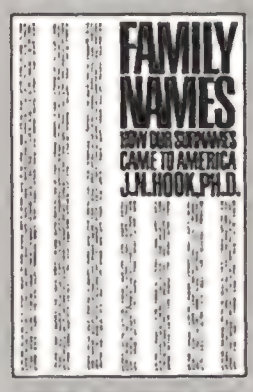

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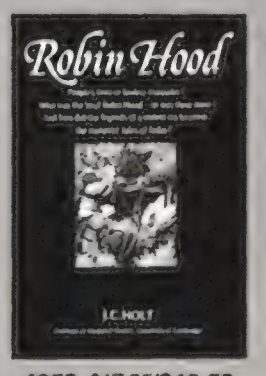

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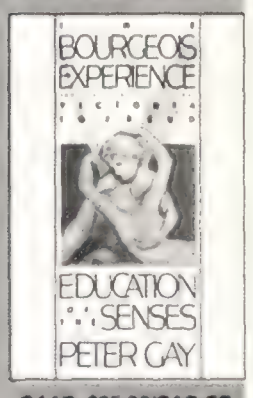

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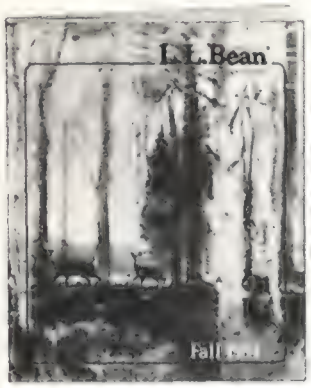

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standard minimum," one of them told me. A squash-blossom necklace, a superb piece of silver-and-turquoise Indian jewelry, was wrapped in transparent plastic film before going in its small foamcore box (which then joined others in a foam-filled crate). I was told that glass should not be wrapped that way, but should go right against the foam. One of the mysteries of chemistry.

A buffalo hide was being covered with acid-free tissue and packed in such a way that no part of it could touch another part. This was the hide with Indian drawings depicting a battle between the Sioux and the Crow. Donald told me that never before have so many Smithsonian museums been represented in a single exhibition. As he put it, "Most of these objects have never met each other before."

The Smithsonian habit of outreach remains strong, even as we explore a foreign clime. I saw, for example, posters being prepared which describe the Smithsonian display at Edinburgh. These posters will circulate in four exhibitions to Scottish schools and villages—a way of bringing the show to those who may not be able to get to Edinburgh.

I was called away from the crating up of what Smithson wrought in order to see what has been wrought at the Museum of American Art. They've gone and changed things around there to such an extent that I would not easily find old friends among the paintings. But the fact is, the changes are a plus.

Director Charles Eldredge and his staff have been moving things around in their half of the Old Patent Office Building (the National Portrait Gallery takes up the other half). They have rearranged the collection so that the ground floor contains the earliest art. As the paintings and sculptures proceed in chronology, upstairs they go. The top floor, with its spectacular Lincoln Gallery (where President and Mrs. Lincoln had their second Inaugural reception), contains 20th-century works.

Eldredge says that the museum's holdings have increased enormously since 1968 when the National Collection of Fine Arts, as it was then called, opened in the splendid old building. Proper care and display of this permanent collection is the museum's primary function—ahead of research and publications and temporary exhibitions. And the chronological approach gives the display more meaning to visitors. What they have at NMAA is an effective lesson in American art history.

At the ground-floor entrance is James Hampton's incredible visionary folk sculpture, *The Throne of the Third Heaven of the Nations Millenium General Assembly,* 36 separate pieces symmetrically placed around the Throne, all gleaming in their aluminum- and gold-foil wrappings. Nearby are Hiram Powers and Paul Manship sculptures—classical as opposed to naive. Directly facing *The Throne* is Albert Bierstadt's impressive landscape *The Sierra Nevada in California.* Then the chronological sequence of paintings gets under way, starting with Benjamin West, the expatriate Colonial who "sired" American art. His canvases are followed by other Colonial and early Federal paintings and finally Indian portraits by George Catlin, Charles Bird King and John Mix Stanley.

Go up to the second floor to get the impact of the American West with those vast scenics by Thomas Moran. Here, too, are works by Winslow Homer and the collection of Albert Pinkham Ryder paintings, which is the largest in any museum. Here, too, is the Hiram Powers gallery—only redone with quiet elegance.

And upstairs again are the realists and abstractionists, the Ash Can School, Romaine Brooks, the Bay Area Californians, and on and on. The walls of the Lincoln Gallery are very light, contrasting with the color splashes of abstract paintings. On the second floor, Victorian colors like rose and a sort of plum-pink set off those grand landscapes. And the ground floor tends to stick to the quiet hues of Williamsburg.

Great stuff. If you can tear yourself away from *The Throne of the Third Heaven* and get involved with the rest, you'll end up with the kind of lively education the Smithsonian stands for.
Edwards Park

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Phenomena, comment and notes

A sojourn in the Florida Keys revives a childish wonder, not only at the intensity of life but even at the stars

Every once in a while, when the fates are looking the other way, you *can* go back again. Not all the way home, true, but far enough to feel currents surging along neural pathways that have lain idle for decades. Some of the sights and sounds that excited a boy are still there for the glazed adult, and when he finds them, he feels all their old power.

June found me in south Florida, criss-crossing Florida Bay in fast runabouts and lurking along mud flats in kayaks, walking the beaches and floundering through swamps, all for the sake of a forthcoming story. (As photographer Bob Noonan put it, "It's a dirty job, but somebody's got to do it." Heaven help us if the fates find out we were paid to do something *we* would have paid to do.)

The Florida Keys are only subtropical; you are not within the tropics proper unless you are in the zone in which the sun can be directly overhead, the belt along the Equator that extends to 23 degrees 30 minutes north and south latitude. But the Keys go down to latitude 25, only a quibble away from the real thing. I had never been in the Keys, but the trip became a return, a coming home to boyhood farther south in Aruba.

On the way to an interview, we stop to look for the swallow-tailed kite that patrols a subdivision on Plantation Key. We have seen the black-and-white speedster before, twisting its head down and back for the prey in its talons as it eats on the wing. It is midday, almost the summer solstice, and the sun is near the zenith. It burns on the bald spot my daughter claims I have (never having seen it myself, I consider her assertion a canard). Walking along the road, looking for the kite, I am bathed in radiation. The light is so intense it is almost tangible, and so bright that even the scarlet blossoms of the royal poinciana trees are overpowered. Away from the car, walking through the sunlight on my own power, I am again a boy who roamed only on foot, watching for birds above and lizards below. The kite does appear, soaring low over the trees, rotating its forked tail to steer. We watch, take photographs and then go on.

The light makes everything different, especially the water. Driving south from Homestead one comes suddenly on Lake Surprise, an expanse of that special turquoise that marks a shallow, sandy bottom in the tropics. One friend says it looks like milk has been mixed with paint. The water is clear as well, and one can see from the road where it is shallow or deep, where the turtle grass grows, where boat propellers have left white tracks through the vegetation. People here pilot their boats by the color of the water, picking out the channels.

Nighttime is a different story. We came back after dark one night when an overheated engine quit on us. The now-black water gave us no clues, so dead slow and some judicious poling eased us in. The experts have an amazing ability to pilot by high-speed dead reckoning. One moonlit night on the Gulf side of south Florida, we were flying along from Marco River to Rookery Bay. I could see nothing but the murky shapes of low-lying islands, but we would invariably go into a long curve a few seconds before a pole sticking out of the water—an unlit navigation aid—would appear ahead of us.

Sunlight has its own special quality in the Keys, as do the colors of the water.

Underwater, boyhood came back in a hurry. Even swimming along the docks in an artificial canal turns up enough spectacle to activate old mental circuits. Parrot fish swim among the pilings and baby barracuda wait for prey, appearing as ferocious as foot-long fish can. Sea hares, looking like so many rubber bathtub toys, laboriously make their way along the bottom. Spiny lobsters are wedged in crevices, and around one rock a full-grown French angelfish, flashes of gold highlighting its trailing fin rays, rolls about. I surface dive with the abandon of a boy, certain in my memory that I used to go down 15 or 20 feet routinely. But in little more than six, the pressure hurts my head and I break off. The legend on a T-shirt in a shop window comes into my mind: "The older a man gets, the faster he ran as a boy."

One morning on the way to "work," we take a detour and run out of Snake Creek on the Atlantic side. About a mile offshore we anchor in all of six feet of water and jump in for a look. We're not on a reef but over a flat bottom, made three-dimensional by sea fans growing like so many shrubs. Not much is happening: a few small, pale fish are moving through the gorgonians.

Then I raise my gaze from the bottom to see that a large barracuda has materialized right in front of me. It looks five feet long to me, but allowing for the magnification of the face mask, I tell myself it is only four. Nothing to worry about. But in fact I am frozen: adrenaline is pouring through my system just as it did in boyhood when I would swim around a coral head and come face-to-face with a barracuda longer than I was. Here, on a light bottom, the silvery fish had been almost invisible. It had taken a second for the sketchy black markings to coalesce into a projectile of a fish, all jaw, eye and solid muscle. It was all out of proportion to the little snappers I had been watching.

Awash in old fears, I start moving slowly toward the boat. I gently urge my companions to do the same when I raise my head to breathe, then quickly duck my head underwater again to watch the great fish drift along with us. Back in the boat, I ask our guide if it was silly to be afraid. I'll love him forever for saving my pride: "Well, a lot of people will tell you they won't bother you, but myself, I'd get out of the water." We try another

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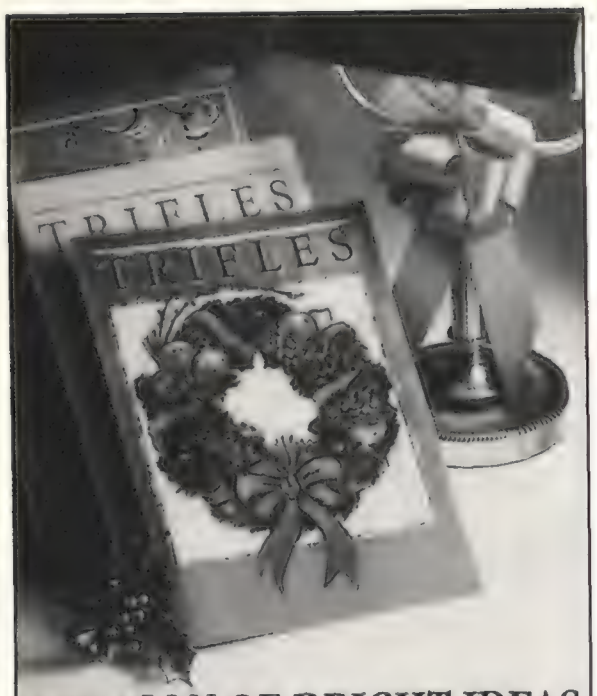

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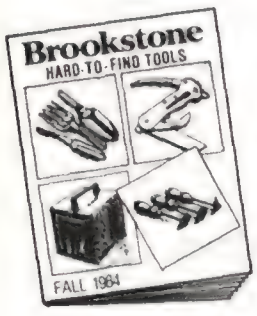

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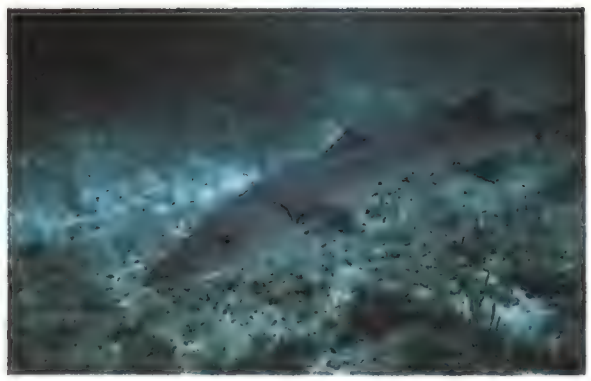

A chance meeting with a barracuda can revive old memories in a hurry.

spot, meet another barracuda and then go back through Snake Creek to the bay side to photograph birds.

The nights affected me as powerfully as the days, renewing a sense of wonder that had turned flabby since childhood. We were sitting in back of the house one night, happily scraped, scratched and sunburned, idly slapping at mosquitoes and talking over the day's adventures. I had my back to the canal and was looking south over the roof of the house at low puffball clouds sailing across the stars. It slowly dawned on me that the hook of stars hanging down from a bright red one over the roof was the tail of Scorpius, a part of the constellation difficult to see from the latitude of Washington, D.C.

Again I was transported. Palm fronds were rattling in the breeze, just as they had years ago when I lay on the garage roof, flashlight and star chart in hand, trying to recognize patterns in the bright blaze overhead. Now even with street light all around, the stars burned in the clear sky. The planets seemed almost to have visible disks, Mars directly under Saturn to the west, Jupiter more luminous still in the southeast. Plantation Key is only about 14 degrees of latitude south of Washington. But it is enough to make it obvious that you, the observer, have moved down the curve of the Earth; not only is the scorpion higher in the southern sky, but the North Star is distinctly lower in the northern sky.

In the Keys I was back at my own beginning, days looking at birds and fish and nights looking at the stars. Some 30 years later I find myself making the same resolutions I made then, to learn what I'm looking at. It was downright embarrassing in Florida to hear a bird I knew perfectly well from the suburbs of Maryland and Virginia and not be able to place it. The roseate spoonbill and the black-necked stilt were easy, but was that song a vireo? And if so, which? The same self-disappointment took hold when I looked vainly for more familiar stars. It took me too long to find even the summer triangle—Altair, Deneb and Vega—rising in the east. Birds I have been working on, but now it will be stars, too.

First days back in Washington were not ideal. The moon was near full, when you could see it, and the sky was a thick haze that made you forget that stars existed. They do, though, and I knew what I needed. In the gift shop at the National Air and Space Museum something else from my early years was waiting for me. *Sky & Telescope* has been published in Cambridge, Massachusetts, ever since I can remember, and turns out to be remarkably unchanged over the years.

The monthly sky chart that fills the centerfold is done in exactly the same style; the map of the entire sky showing where sun, moon and planets are that month is much the same; and so are all the observer's notes, such as lists of dates on which variable stars will reach their maximum light. There is a new section on computing, pictures of a beautifully machined, homemade telescope, and very high-quality articles by professional astronomers. But it is the charts I want. Other magazines do them, and do them well. But I grew up on *Sky & Tel*, and looking at its chart brings back every wave of wonder I ever felt about the cosmos. Surrounded by yelling, jostling children in the shop, I am transported back to a time when I really felt—like an Englishman in a foreign country who believes he will be understood if he speaks slowly and loudly—that if I looked at the stars long enough I would understand them. A printed page touched me as strongly as the sight of a lizard on a palm tree, a line of pelicans gliding just above the water at dusk.

So now, when I load up the knapsack with field guides to everything I can think of, I will add the current *Sky & Telescope*. And when I come out of the marshes at, say, Point Lookout, where the Potomac empties into the Chesapeake, as darkness falls, I won't jump in the car and head back to Washington. Instead I will lie down on the sand near the tip of the point and study the stars. I will be going back about as far as I can go.

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By John G. Mitchell

Where corn is king

It's the American grain and in the fertile soils of Grundy County, Iowa, it reigns supreme

Stretching clear to the horizon, a midsummer cornfield swelters in Grundy County's Palermo Township.

It strikes me as passing strange that corn does not stand taller among the popular icons of America. Over all the generations growing it, familiarity may have bred too much contempt. Ask a friend or stranger to name a single flash-card image that best reflects the country, and what are you likely to get? You get the skyline of Manhattan, the Statue of Liberty, the Capitol dome, the Grand Canyon, the Golden Gate. You might even get apple pie or the automobile. But *corn*? That stuff that sticks between your teeth? That tassel patch on some hardscrabble hillside, that sultry green monoculture hugging the undulant midlands, that chicken feed? Why corn?

Well, why *not* corn? It is absolutely 100 percent indigenously American. It runs with the land. It was here thousands of years before pale-skin rovers swooped in from Europe; and for nearly three centuries thereafter, its cultivation and harvest and conversion to foodstuffs occupied more time in the lives of most Americans than any other farm pursuit, bar none. It was corn, and the soils needed to grow it, that pulled the Republic west to the sundown sea. It was corn that made it possible for many of the earliest settlers to survive. And as it runs with the land, so does the husky heritage of corn course through the language. Our slang is starched with it; our songs, too. "I'm as corny as Kansas in August," wrote Oscar Hammerstein II, with scant concern for the fact that Kansas is much better known for its wheat.

Corn, unlike wheat, is practically ubiquitous. It is grown in every one of the coterminous United States. It

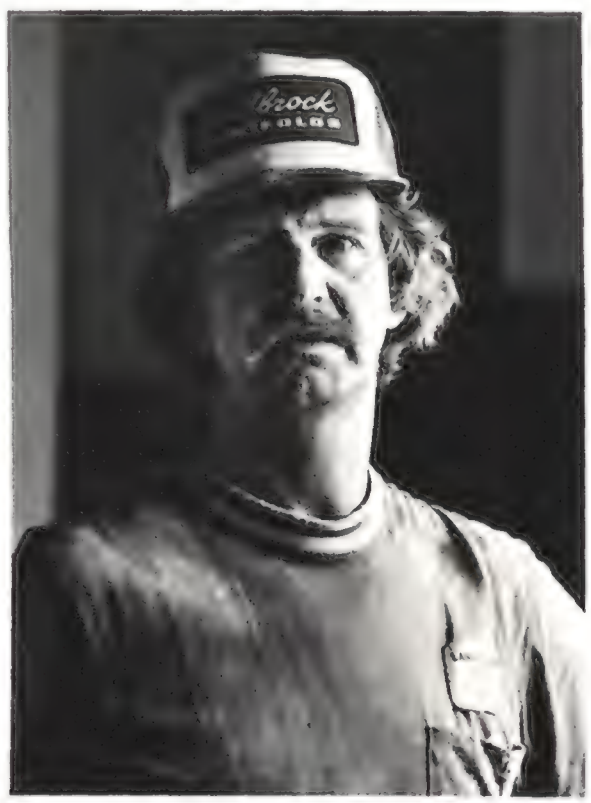
Photographs by David Plowden

Hawkeyes of Grundy County reflect their land: easy-going on top, full of energy underneath

covers, in season, a full quarter of the nation's cropland. In total volume of production, it ranks Number One. Of all the grains, it is the most efficient converter of solar energy; one acre of corn can yield the equivalent, in bushels, of three acres of wheat. Even in an off-year such as 1983, when devastating drought and a new federal payments program cut production almost in half, corn growers here harvested more than four billion bushels —almost enough to supply one bushel to every single human on Earth.

The uses of corn are ubiquitous, too. Refined, the bulk of it is starch; and corn starch finds its way into cardboard, crayons, lubricants, plastics, wallpaper. From the starch, too, comes syrup. And that finds its way into baby foods, ice cream, pickles, marshmallows, salad dressings and soft drinks. Corn dextrose is used in the processing of antibiotics and rayon. Corn alcohol supplies us with bourbon, bay rum, ethanol, deodorants, resin, incense and mouthwash. Corn oil conjures up margarine, mayonnaise, shortening, soap. And last but by no means least, there is just plain corn—sweet corn on the cob for human consumption, or (and here is by far the most common use) field corn that is used to feed chickens and cows and pigs.

To appreciate the native grain, one is fairly compelled to look beyond the statistics and by-products to the kind of country where people view corn as king. So last year, toward the end of planting time, I skedaddled out past the skylines to Grundy County, Iowa, just off geographic center of the nation's top corn-producing state. Now Grundy itself is not consistently the top producer among Hawkeye counties, but it comes close enough with yields jumping ten bushels an acre above the state average, 15 above the national. It is a gently rolling county, Grundy, though flat-out in some places, and it is blessed with soils that are counted among the richest in the world—Tama and Muscatine and Garwin and Dinsdale and Klinger, in various associations—running to depths of three to four feet, loamy,



Dennis Lauterbach has handled corn at the feed mill in Dike for 18 years.

friable, organic, spongy to the rains, and of a certain color falling somewhere between German chocolate and briquette black.

Given such a fertile base, precipitation averaging 32 inches a year, and generally salubrious temperatures for the long growing season, it's not surprising that almost 95 percent of Grundy County is given over to the production of agricultural commodities. There is space for hay and oats and assorted seed crops, and pasture for livestock. There are feedlots and pig markets. But more than anything else, there are great expanses of cropland on which the farmers of Grundy County grow their prodigious yields of soybeans and corn. The leftover land is where the people live—two or three farmhouses to the square mile, and, for those who cannot live by soil alone, such tidy, compact communities as Grundy Center, Reinbeck, Dike, Holland, Wellsburg, Stout and Conrad, "the Black Dirt Capital of Iowa," down there in the Tama-Muscatine.

To this outlander, the Hawkeyes of rural Grundy County seem a solid, rooted lot. They reflect the country: open and easy on the surface, energy-intensive underneath. It is not a place conducive to loafing. The days afield are long ones; at planting and harvest times, twice as long as an office worker's. And the back-road miles can stretch across half the county to town or to school, where sporting events tend to provide the social focus. Urban skylines may send vibrations to rattle the edge of the farmer's world, but in Grundy one perceives a certain resistance. There is a holding fast to family values and traditional country ways.

Not that all those ways can be quite the same as they were 50 years ago when Grant Wood, over in Cedar Rapids, was painting his dairy-barn farmscapes and American Gothic pitchfork folk (SMITHSONIAN, November 1980). Here in Grundy, most of the dairy barns are long gone, and the milk cows with them; and the tool in the farmer's hand is no longer the pitchfork, it's a pocket calculator. And the Gothics are gone, too, to the cemeteries. In Wood's day, a farmer with three sons could safely figure to pass his place on to the eldest and know that the other two would somehow contrive to go on farming, some-

Richard Bockes and his brothers sell most of their corn to a grain dealer.

where else. It does not happen that way anymore here in Iowa, unless the legacy is untypically large in measure of acres and paid-up machines.

What *is* happening with alarming frequency in Iowa and other parts of the Midwest these days is farm bankruptcy and foreclosure. Squeezed by high interest rates, lower prices, bad weather and a crushing debt load, hundreds of farmers throughout the nation's breadbasket and corn belt are going under. Even longtime family operations once thought to be immune to foreclosure—typically, a father-and-son team who plowed their 1970s profits into expansion rather than debt retirement—are in trouble. Southern Iowa is one of the hardest-hit areas in the country. Grundy County, a little farther to the north, has managed to escape disaster so far but only because its weather has been better during each of the last three growing seasons.

Spring is a good time to be in Grundy County, first time ever. Not much corn to see yet, except in the silos and grain elevators etching a skyline of their own above the planted fields. But new corn is on its way, out there between the chocolate furrows, kernels buried, seminal roots already sipping moisture from the soil. Though not nearly so *much* new corn, spring of 1983, for there is this surplus in storage—the accumulated yield of bumper crops and trade embargoes—and Uncle Sam is giving corn growers "payments in kind" (PIK, they call it) to idle portions of their fields. The program will not be offered again next year, and so to take advantage of it, Iowa farmers have cut back their corn acreage by about 40 percent. Still, apart from the stalks and stubble of the fallow fields, everything looks spanking fresh this fine spring day in Grundy County: gingerbread porches, conifer windbreaks, John Deere combines and the unseen corn a-going it in the Muscatine. Me, I'm on my way to the Bockes farm.

Bockes is a big name in Grundy County, and an old one, too. The founding father, Lewis the Pennsylvanian, purchased a patch of prairie here in 1855 when it was all plow-busting sod. Because of one thing or another, including the Civil War, no Bockes got around to farming it until 1870. They have been here ever since, growing corn. Father to son, Samuel to Simon, Simon to Dale, Dale to Richard and Robert and Roger. Four generations of Bockes, 113 crops of corn. And fast hands. In 1934, Dale's brother, Clarence, won the Iowa Corn Husking Championship by husking 2,263 pounds of corn in 80 minutes. A rate of one ear per second—seized, stripped and tossed.

It is planting time. Richard, Robert and Roger are off in their big John Deere Model 7000 16-unit planters, sowing their fields with seed, herbicide and insecticide—one-two-three, just like that. All in 16 rows.

Their mother, Mary Bockes, stands with me at the roadside.

"My dad used horses," she says.

We watch one of the planters top a swell in the undulant land. Faraway, silhouetted in the afternoon light, the machine turns the color of Muscatine, then melts down the far side of the rise. "You hardly ever see a horse in Grundy County nowadays," says Mary Bockes. "How fast things change."

Change was a great deal slower, once. Consider the ice. It stopped right here in Grundy County, piled up a high moraine, then skulked away, leaving its silty gift to the wind. The wind made loess of it, sifted it out across the land, packed it in thick eolian layers over the glacial drift. And after the loess came grass—bluestem and switch grass, maybe, though species more primitive likely took root here first. To measure that time frame, that change, best to start counting in tens of thousands of years.

Once, too, probably in a different, more humid sort of country, there was another grass so primitive, so long lost to our modern way of accounting for such things, that we have not even settled on a name for it. No matter. Whatever we might someday agree to call that grass—it was eventu-

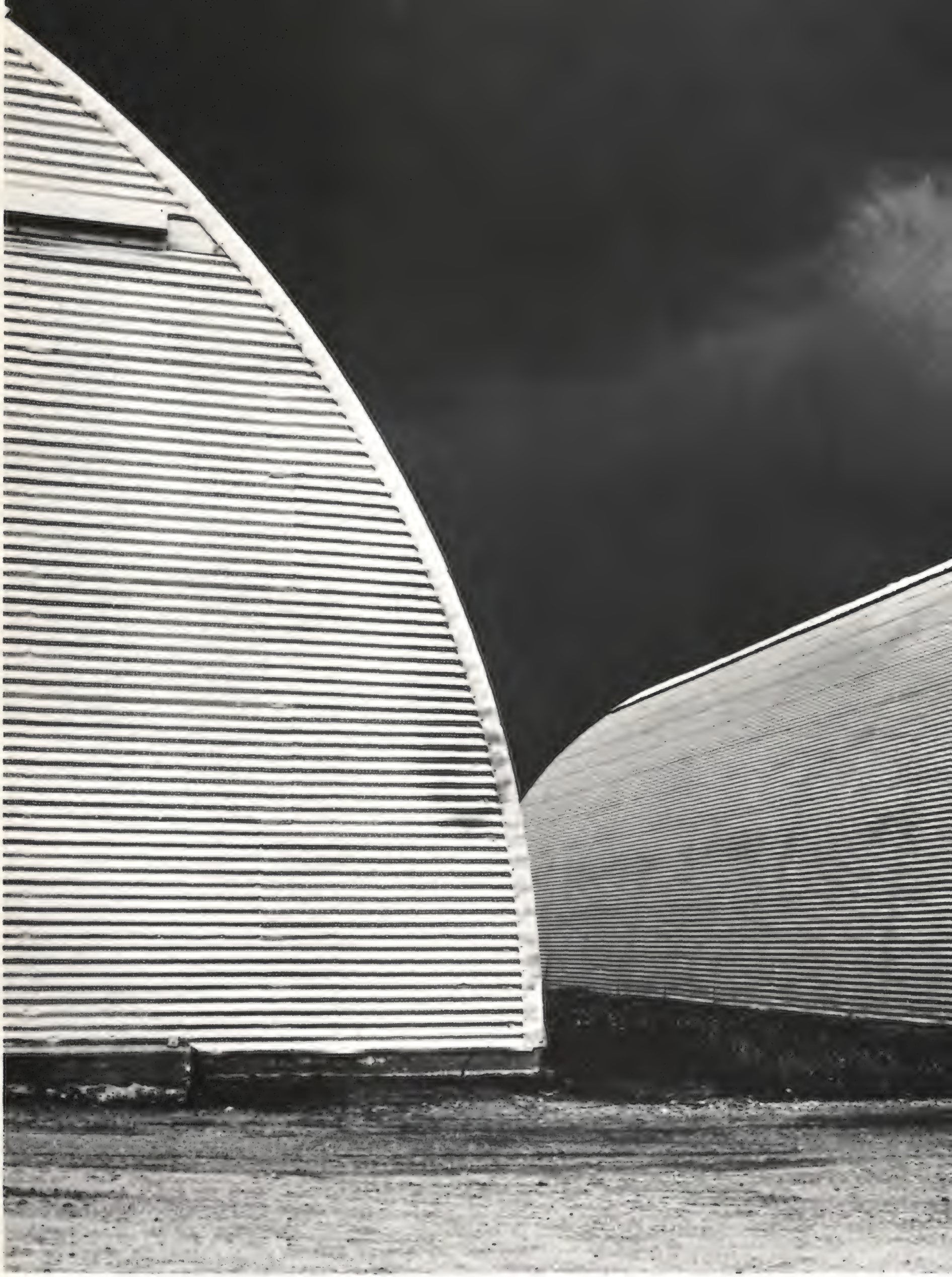
Roger Dudden grows enough corn on 400 acres to feed 3,000 hungry hogs.

John Mitchell, a field editor with Audubon, *is the author of* Bitter Harvest. *David Plowden is noted for his photographs of the Midwest.*

Grundy County epitomizes many of the changes that have transformed American agriculture in recent years. Its farms are much larger now, and mechanized. Its old wooden barns have given way to immense new structures of metal and concrete. But everyone still worries about the weather, for Grundy's corn will always need rain in order to grow.

Hanging in a grain elevator, scoops will be used to pick up every last kernel of corn.

Modern storage silos in Reinbeck are an upright presence in a horizontal landscape.



Older metal bins stand ready to accommodate another bounteous Grundy yield.

Spring rainwater runs off the soil in freshly saturated Grundy field.

After pollination, these tasseled stalks near Palermo will bear full ears of corn.

Two ways to dry corn at Glen Hockemeyer farm: old crib and new blowers (right).

Grundy County is not immune to family-farm bankruptcies but so far it has escaped disaster

ally domesticated as corn. This was not the Bockes kind of field corn, nor the sweet corn that sticks between the teeth, but a tough ancestral species bearing fruits the ancient people of America would learn to utilize as food. Where exactly corn first came under human cultivation remains a secret, but archaeologists are certain that corn was cultivated widely by Amerindians for at least 3,000 years of pre-Columbian time, and likely a good deal longer.

Relict cobs, charred or petrified, have been uncovered from southern Canada to Chile, from tidewater to plateaus two miles high, in almost every known cultural niche—Algonquian, Athapascan, Aztec, Maya, Inca. Then, in a perversity of European logic, Columbus was said to have discovered America. Wheat-eaters, long bored with their own thin breads, cheered. For now, by the same twist of the Caucasian mind, it could be said that Columbus had also discovered corn.

Indian corn under paleface cultivation spread far and wide. By 1790, America had a corn belt. It reached out of the Cumberland and Shenandoah valleys, across the Appalachians, to the western traces of Kentucky and Tennessee. Even then, corn was a thing of abundant variety. Once Puritan preacher Cotton Mather had noted how corn in a Massachusetts field took on the hue of the kernels upwind, nothing would stop planters from crossbreeding their crops for showiness and yield. Thus, from the Indian's flint corn (tough and starchy), the southern gourd seed (softer and dented), and possibly an aboriginal sweet corn or two, there emerged Reid's Yellow Dent, Darling's Early, Golden Sioux, Mandan, Boone County White, Bloody Butcher and Tom Thumb. All these and heavenly hundreds of others, too—and all by the time the Bockes were getting to feel at home on the Muscatine.

I have left Mary Bockes down the road at the ancestral farm, and I am walking alone now among the gray headstones of the Alice Union Cemetery. Here is the oldest: Sarah Price, 1829-1870. Here are Heltibridle, Katzer, Klinefelter, Martz, Minich, Strickler. And here are the Bockes. Samuel, 1840-1937. Simon, 1868-1955. Dale, 1910-1977. From stone to stone, the engraved time frame is barely a century and a half, yet it runs from acre yields of 25 bushels to 160, from sod-cabin corn patch to square-mile sections, from the hoe to the moldboard plow to the Deere 7000. Beyond the headstones, the horseless fields of Grundy County stretch out of sight and out of mind. How fast things change.

Worker helps dump shelled corn from truck into a grain elevator in Dike.

In Iowa, nothing changes quite so fast as the weather, unless it is the price of corn. Big, brawny weather boils out of the High Plains, stabs down from the Dakotas, or rolls up sultry and hot from the Gulf. It keeps the farmers guessing. There is a saying here that you can lose a crop three times before you get it to market. In the year of PIK, it's a wonder there was any corn crop at all.

First to Grundy County came the rains of May, chasing me out of the Alice Union Cemetery and the Bockes out of their fields; drenching rain, more than three inches in a day and a half, pooling up in the furrows between the rows of newly sown corn. I went out of the rain into Richard Bocke's machine shed, where he was ministering to a piece of equipment on one of his Deere tractors. The unit, with its cab enclosing a space-age computer to monitor the distribution of seed and chemicals, represents an investment roughly equivalent to the full purchase price of a four-bedroom house in some upper-crust suburb. For all that money, the tractor gets to work off its debt only three months of the year, during planting and harvest times. And now, this—the machines idled, the pools in the fields, and raindrops drumming on the roof. "I hope it lets up soon," I said to Richard Bockes. And he said, "So does my banker."

The weather let up, all right—and then threw a scorching tantrum across the whole wide corn country. Record-high temperatures in some places and, in others, hardly a trace of precipitation. From the Carolina piedmont to the sand hills of Nebraska, a drought reminiscent of dust-bowl days settled across the nation's cornfields. Some turned October brown under the August sun. Governors drew lines around blocs of rural counties and called them disaster areas. But not around Grundy County. Sure, the kernels would be stunted a bit on the cob, the yield off by ten to 15 percent in most of the fields. But there would

be no drought disaster in Grundy County—not this year, at any rate—thanks to those deep and spongy eolian soils. Down two feet in the Tama-Muscatine, even in August, corn roots were slaking their thirst on the rains of May.

At the height of the drought, I returned to Grundy County and called on some of the growers I had met in the spring. Richard Bockes was back out behind his machine shed again—"shed" is misleading; the structure is closer in size to an airplane hangar—and he said he was hoping the drought would lift and let in some rain. I didn't have to ask what his banker was hoping. Inside the shed were two new John Deere Turbo 8820s, dwarfing the 7000s of yestermonth and representing, said Bockes without specificity, "an ungodly investment." Come late September, weather permitting, Bockes and his brothers would be climbing into these mechanical behemoths to harvest corn and soybeans from a spread measuring 5,000 acres. "It'll take us," he figured, "about eight weeks. Not counting sleep."

Reinbeck (population 1,800) is a typical corn-belt town where farmers can usually find what they need around Main Street and Blackhawk.

Farming on such a grand scale is not yet typical of Grundy County, but it appears to be heading that way. A generation ago, the basic size of the family farm was a quarter-section—160 acres. Now, given the economics of mechanized agriculture, a grower can hardly start off with much less than half a section, and many are working a full one or more. Each year, the overall number of farms in the county declines a few digits—folks sell out, or die with no farming heirs to carry on; a few, stretching debt beyond the edge of cash flow, go bankrupt. But the land under cultivation remains fairly constant. One less farm simply means one or two others growing larger. More land, more machinery, more debt. No wonder a Grundian knows what his banker is thinking when the weather turns bad.

Even in the best of weather, the cost of preparing and harvesting an acre of field corn is prodigious. Cooperative Extension Service economists in Iowa last year drew up this bill of particulars for an acre yielding 115 bushels of corn: machinery costs, including depreciation, interest, insurance, fuel, oil and repairs, about $83; land, at cash rent equivalent, $120; seed, fertilizer, herbicide, insecticide and such variables as crop insurance, $91; and labor, figured at $6 an hour, about $19. Total cost: $313, or $2.72 a bushel. Not bad, if corn is selling at $3 a bushel. But if the price should drop, if too much rain or drought should shrivel the yield—not good enough.

There is no easy formula for agricultural success — or survival — in Grundy County. Each grower tailors his operation to suit a particular expectation of next year's market and a knowledge of what his soil can best produce. In fact, if you parsed these farms with no regard for their relative size, you would probably find no two in the county exactly alike. Diversity is rampant.

The Bockes, for example, sell almost all their corn to the proprietors of a grain elevator—that perpendicular bridge between grower and consumer, between the field and the shelf. Of those who do not work on farms in Grundy, more than a few can be found toiling in or around grain elevators instead. Dennis Lauterbach, for example, has worked in the feed mill, next door to the grain elevators at the Farmer's Co-op in Dike, for 18 of his 43 years. One of his jobs is to help store corn and other grains that will be processed for livestock.

More land, machines, debt.
No wonder a Grundian knows
what his banker is thinking

Cross-county, north of Reinbeck, Roger and Marcia Dudden plant half of their 800 acres to field corn, but sell none of it; shelled, it is just enough corn to feed what they *do* sell—their hogs. Over in Palermo Township, Gerald and Mary Lou Strickler grow no field corn to speak of, yet consign half of their 350 acres to the production of seed corn—the stuff that gets Bockes and Dudden started anew in the following year. And yonder in Colfax Township, Glen and Neva Hockemeyer last year put 200 acres into the PIK program; 400 into soybeans, pasture and hay, and 300 into field corn, of which, when harvested, four out of every ten ears would be kept on the farm to feed cattle and hogs, and the rest of that crop sold for cash income.

The road to the Hockemeyer farm was a sea of mud when I wallowed through in May, a ribbon of dust in August. We sat both times in the kitchen of the farmhouse, and we talked of the weather and the price of corn and the changing ways that can creep right up on you if you don't take notice. There had been a number of dairy farms in Grundy County when he and his wife moved here, Glen Hockemeyer said. That was only 13 years ago, and now almost all the herds were gone, the great old American Gothic barns good for nothing but tool sheds, or kindling. Nowadays, some Grundy folks were even stepping away from beef cattle. Moving to hogs—the "best mortgage lifters going," said Glen Hockemeyer. Only six months to market, a cash flow much faster than beef's. Easier on the feed, too. Only three pounds of corn to produce one pound of pork.

On the breakfast table that August morning lay the *Des Moines Register*. Page One of the Home & Family Section proclaimed beef and other high-fat foods to be America's "Health Enemy No. 1," while pork got off with the lightest of raps on its chinny-chin-chin. "That's another reason we're shifting to hogs," said Neva Hockemeyer. "The housewife reads that and she's just not going to buy that much beef. So what are we to do? Does the consumer want more pork? More cereal? We were told to go out and grow all this corn. . . ."

"And we grew it," her husband put in. "We had two eight-billion-bushel crops in this country, back-to-back, '81 and '82. We also had a grain embargo on the Russians. Now we have PIK. But we won't have it next year. Next year, they'll be telling us growers to plant fence row to fence row all over again." (In most parts of the country, in fact, the amount of corn planted this summer did rebound to pre-PIK levels.) "Well, I'd like to know something," said Neva Hockemeyer. "What do people want us to do with all this corn?"

One of Grundy's best corn producers, Glen Hockemeyer has soybeans, too.

Hockemeyer himself might well be counted a part of the problem—if, after all, it is a problem—for he is a savvy steward of the Tama soils, and just two years or so ago his corn yield, at 184.7 bushels per acre, was ranked second highest of all the farms in this high-yield county. "It'll be way down this year," he said. "And if we don't get some rain soon, maybe as low as 120 bushels."

He walked me to my car. He had something in his wallet he wanted to show me. It was a little dog-eared card. *The Farmer's Last Will.* It bequeathed to the weatherman "rain, sleet, and snow for the funeral," but strangely, no drought. It said to the gravedigger: "Don't bother. The hole I've dug for myself over the years should be deep enough." He broke into a grin as wide as a Halloween pumpkin's. "I keep it," he said, "for good luck."

I wished him bushels of luck and went down the ribbon of dust to the hard-top, and followed that east to the airport at Waterloo, next county over. Then an airplane came out of the hard sky and took me away. As we circled, climbing for altitude, I looked north through the window and saw a wall—a mountain range—of anvil-head clouds closing in, and we raced them all the way to the Mississippi River. I have no idea how many inches of rain fell behind us on Grundy County that afternoon. I only know that its timely arrival allowed Glen Hockemeyer to cancel "the funeral," and that, whatever the weather, he is out there now with the Bockes and Duddens and Stricklers, each fine family carving its own indomitable niche one crop deeper in the American grain.

With giant combine, Richard Bockes harvests up to a ton of corn a minute.

Hydrostatic

Bringing baby home in the Peugeot

She has ten tiny fingers, around which she has already wrapped her grandparents. And ten tiny toes.

She has enough clothes to stock a small store, including eight pairs of little knitted bootees that will never stay on.

Her face goes scarlet with anger if there's any stalling at feeding time.

There is some agreement that she looks like her grandmother on her mother's side—although this notion does not sit well with the other side of the family.

Dad will get up and check her fourteen times during her first night at home, each time making a mental note to do something about the creak in the floorboard.

She has pudgy cheeks, fat little knees, and almost no hair.

She is, they agree, the most beautiful baby anyone ever had.

Oh, the responsibility of it all!

The 505 STI's seats are wrapped in a soft, supple leather, with the front pair heated in the winter. Comfort of body, indeed.

The car they are bringing baby home in (Dad will drive very, very carefully) is a Peugeot 505 STI.

It is a veritable fortress of strength. The occupants are cradled within a body that is welded in 4,032 places. The body is protected by 21 separate anti-corrosion measures.

The steering of the Peugeot is itself a form of safety device. It "knows" when to step in and help the driver . . . and precisely how much help is needed. If the road is icy or wet, the amount of power assistance is automatically cut back so that you retain the feel of the road through your fingertips.

The Peugeot is very much a car for comfort of mind.

It is also a car for comfort of body. So lavishly equipped is the 505 STI that the only way you can spend more money is if you prefer an automatic transmission.

Everything from air conditioning to cruise control to side mirrors that de-ice themselves... all is standard equipment.

Prices of Peugeot sedans and station wagons—all available with gasoline or turbodiesel engines—range from $11,435 to $17,965.* Please call 1-800-447-2882 in the continental U.S. for a 32-page color brochure and the name of your nearest Peugeot dealer.

*Based on P.O.E. manufacturer's suggested retail prices. Actual prices may vary by dealer. Destination charges, taxes, dealer preparation, if any, and license fees are extra.

PEUGEOT

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By John Pfeiffer

Early man stages a summit meeting in New York City

Ron Clarke of South Africa and Dean Falk of Puerto Rico examine fossil at historic New York meeting.

Inside two closely guarded rooms, the world's top paleoanthropologists came face to face with the staring skulls of our own ancestors

Tension at Kennedy International Airport in New York. Among passengers disembarking from an overseas jet is a man carrying a box as gingerly as if it contained a live hand grenade. A special agent meets him and rushes him through customs and into a waiting black Cadillac limousine, which pulls away with a police car driving behind.

No cloak-and-dagger episode this, but a routine carried out many times as the culmination of a daring, high-budget venture four years in the planning and unprecedented in paleoanthropology. Limousines with police escorts headed for Manhattan's American Museum of Natural History, overseeing the safe delivery of 40 priceless fossils from home institutions in France, South Africa and half a dozen other countries. Ever since last spring, the museum has had the irreplaceable specimens on public display—mounted behind one-inch laminated acrylic panels in batterproof, electronically monitored exhibit cases—at an estimated cost of $500,000. (Construction work on the subway line under the museum has been halted until after the exhibition to protect the fossils from vibrations.)

As far as the march of science is concerned, the high point of the entire operation took place before the exhibit opened in two closely guarded fifth-floor rooms. All the specimens were there, laid out in the open on tables to be picked up and examined from every possible angle. It was a once-in-a-lifetime opportunity, a breathtaking abundance of riches, for an international group of scientists accustomed to working alone and often with casts—which may be misleading—rather than with collections of the real objects ("God's original casts," in the words of one anthropologist). Never before had so many fossils and fossil experts been concentrated in so small a space.

Skull of a primate that roamed Egypt 30 million years ago is dwarfed by that of a modern human.

The experiment worked: the risk paid off. Nothing was broken, a minor miracle considering the supercharged atmosphere. A magic exists in the remains of our wilderness ancestors—what Lita Osmundsen of the Wenner-Gren Foundation for Anthropological Research calls "a kind of bone fever"—that affects scientists, the coolest as well as the romantics, no less than laymen. There has never been anything dispassionate about the search for roots, for human origins. During four argumentative and memorable museum days, investigators crowded into those high-ceilinged rooms, laboratories made over for the occasion, and collectively confronted the bony evidence for the transition from a variety of strange apes to something even stranger, namely us.

Judging solely by the general hubbub, it could have been a cocktail party in high gear, that is, until you came up close and listened. "Show me." "It's more like a chimp than a human." "I don't see it." "Listen."

Photographs by Enrico Ferorelli

A summit meeting of fossil hominids

Scientists heft, measure, scrutinize or simply contemplate the fossils of our hominid ancestors.

"It just doesn't work." Fragments of conversation illustrating the basic problem of interpretation. Every skull is a complex mix, a mosaic, of scores of archaic or primitive features and scores of more modern or progressive features, dental and supraorbital and zygomatic and mastoidal and so on and on. The trick is first to decide which features are which, which to concentrate on, and then to convince one's colleagues.

Revelation at a nearby table: "It's amazing. The similarity is amazing." A scientist is responding to the side-by-side comparison of an original frontal bone from Israel and a cast from China (the original having been lost during World War II). An investigator recalls the task of reconstructing a shattered skull from Australia: "In trying to fit the pieces together, most of my luck came during the first 15 to 20 minutes of the day. Not much happened during the rest of the time. There were more than 400 pieces, and it took me six months!"

Not all the action took place in groups. Here and there lone investigators, immersed in worlds of their own, sat in face-to-face confrontation with selected specimens, a kind of silent communion spanning the ages. The upshot of the skull sessions was some exciting new insights and plans and, above all, a new feeling of working and learning together.

Most of the experts agreed on most of the broad points, something all too easy to overlook in the midst of intense debates about the subtler points of cranial anatomy. The earliest known hominids, members of the human family dating back four or so million years, were the australopithecines of South and East Africa, creatures large in tooth and small in brain and rating ancestral status most obviously because of their upright gait. All the experts in attendance agreed on that, including both 91-year-old Raymond Dart of the University of the Witwatersrand in Johannesburg, who six decades ago first identified the genus from a juvenile skull known as the "Taung baby," and Elwyn Simons, head of Duke University's Center for the Study of Primate Biology and History, who conceded on the basis of accumulating evidence that *Ramapithecus*, an extinct primate and his previous candidate for earliest hominid, seems to have been related to the ancestors of today's orangutans.

Some postulate that we might all be australopithecines today had it not been for a seafloor upheaval and the closing of the Central American Seaway, an ancient water gap separating North and South America. The newly formed Isthmus of Panama connected the two continental masses, triggering a chain reaction: the northward diversion of equatorial Atlantic Ocean currents, intensification of the Gulf Stream, the onset of heavy snowfalls up north, and the gradual buildup of higher and higher drifts to glacial proportions.

That process, culminating in mile-high ice sheets covering the Arctic and Scandinavia, began about three million years ago. Tropical Africa also felt the changes. Climates became drier, perhaps cooler, accelerating a

They had four days alone with the bones, a chance to work with tray after tray of the real thing.

trend toward wide-open country, dwindling forests and spreading woodlands and grassy savannas. According to Elisabeth Vrba of South Africa's Transvaal Museum, life has never been the same since: "All hell broke loose on the savanna. There was a pulse, a wave, of speciation and extinction."

Survival depended on a new mix of dietary items: fewer soft forest delicacies (fruits, succulent leaves, buds) and more woodland and savanna fare (roots, seeds, tubers). Some hominids adapted by developing an extrapowerful chewing apparatus which distinguished later from early australopithecines, and which Yoel Rak of Tel-Aviv University discussed at the museum meeting, pointing to certain details on appropriate fossils—for example, a pair of columnlike structures running alongside the nose, pillars of thickened bone adapted for chewing stresses (p. 54).

The specimens show other significant changes such as heavily buttressed jaws, flaring cheekbones, overhanging brow ridges and crests along the top of the skull for the attachment of massive muscles and, for grinding and crushing, supermolars twice as big as ours. As much muscle as possible was brought up front, providing a maximum nutcracker action of the jaws. These are among the telltale features of the fossil remains of *Australopithecus robustus* and its even more rugged relatives. Unfortunately, they wound up as losers in the primate-survival race. They appeared roughly two to three million years ago and endured for a respectable period, only to vanish without trace approximately a million years ago.

The fourth edition of John Pfeiffer's book about the history of early man will be published next year with a new title: The Emergence of Humankind.

A trend to smaller faces, larger brains

What saved the day for hominids was the branching off of another primate line. Keeping her options open, nature invested in thinkers as well as chewers. While brute-force australopithecines developed bigger teeth and jaws without much change in brain size, the other line represented a reverse trend. They went the *Homo* route, evolving smaller teeth, smaller faces in general, and bigger and bigger brains. Like a benign tumor at the head end of the spine, the brain tripled in size with the coming of *Homo sapiens* and *Homo sapiens sapiens,* "doubly wise" people like ourselves.

The first humans were also the first regular meat eaters and users of stone tools. Somewhere along the line they acquired speech, the faculty that more than anything else widened forever the gap between them and the rest of the animal kingdom. The change has left its mark on fossils—that is, if you are clever enough at the fine art of "reading bone." One place to look is at the bottom of the skull, near the foramen magnum, the large hole through which the spinal-cord nerve cable leaves the cranium.

There are small bones about the size of a couple of postage stamps, part of the "basicranium," which forms the roof of the vocal tract, including the larynx or voice box. A flat basicranium indicates that the larynx lies relatively high in the neck; and that, in turn, indicates limited space for the production of varied sounds, specifically a limited capacity to produce vowels. The high position is typical of mammals, including chimpanzees and other apes. We owe our outstanding ability to produce a rich range of sounds to a low, descended larynx, a more voluminous vocal tract made possible by a marked bending or flexing of the basicranium.

Jeffrey Laitman of the Mount Sinai School of Medicine in New York, who has done much of the recent work, used specimens to show how such observations apply to primate communications in times past. Sts 5, the skull of an adult australopithecine who died in

Thickened areas of bone along nasal cavity served as "shock absorbers" in early South African hominid.

South Africa more than two million years ago, has a flat chimpanzeelike basicranium. So does Dart's Taung baby. On the other hand, specimens representing early *Homo* show a definite bending, although not to the extent found in modern skulls. "This does not mean that early humans talked," Laitman emphasized, "only that they had an enhanced ability to produce the sort of varied sounds used in speech."

Further evidence emerged in other discussions. The inside of the skull may contain imprints of the brain's surface, enduring bony hollows to match bulges of matter long since disintegrated. On the basis of separate studies of endocasts, impressions of internal cranial surfaces, three investigators—Dean Falk of the University of Puerto Rico, Ralph Holloway of Columbia University and Phillip Tobias of the University of the Witwatersrand—agreed on the presence in early *Homo* specimens of internal bulges on the side of the brain where modern man's major speech centers are located, bulges not found in the brains of apes or australopithecines.

Notice the nature of the evidence in these studies. No single observation or set of observations, no matter how plausible or forcefully presented, can prove anything beyond the shadow of a doubt, a common enough state of affairs in research on human origins. But converging observations from a number of different directions are something else again, and they add up to a good circumstantial case for the notion that language in some rudimentary form arose two to one-and-a-half million years ago among the first representatives of the genus *Homo*.

The physical traces of social evolution

So much for beginnings. Fossils also have something to tell us about the evolving behavior of more recent ancestors. A decade or so ago workers in a quarry near Rabat, Morocco, noticed a bone imbedded in a limestone block. It was the skull of an adult, perhaps 40 years of age, and originally classified as a "progressive" specimen because of its rounded modern appearance in the back portion. According to Jean-Jacques Hublin of the University of Paris, however, this feature and others point not to an advanced evolutionary status, but to pathology dating back an estimated 400,000 years. The individual may have suffered from a form of torticollis, a muscular disorder that can jam the head permanently to one side. One implication is that victims of this crippling condition could never have survived past infancy without the compassion of others reared to care about, and care for, individuals incapable of fending for themselves in the physically demanding hunter-gatherer's world.

Another fossil of about the same age suggests an equally human, if less humane, aspect of our species. A skull from Ethiopia has some 15 scratches across one cheekbone, a pattern studied by Tim White of the University of California, Berkeley. The scratches appear as clearly defined parallel grooves, V-shaped and some a bit rounded. Specialists in "taphonomy" (from *taphos*, Greek for "tomb"), the study of postmortem changes in bone, have identified this pattern as man-made, the sort of markings that could only have been produced by three or four strokes with a stone flake.

The original of this specimen was not on hand at the New York meeting. But the Berkeley anthropologist was, and he found suspicious-looking scratches on several specimens, in addition to those around the bottom of the Neanderthal skull cap. They were a skull from a gravel pit at Steinheim, Germany, and two Yugoslavian specimens. White is looking out for further markings that, upon microscopic analysis, may turn out to be clues to deliberate procedures performed at a surprisingly early date. He suggests that the scratches on the Ethiopian specimen are traces of an ancient defleshing. This might imply a number of early social

developments—organized conflict, tribal rituals and the taking of trophies.

All this served as prelude to the most spectacular transition since ape-to-hominid times. A burst of culture, a creative explosion, moved into high gear about 20,000 years ago in Europe, the same process that continues to accelerate at a breakneck pace among us today (SMITHSONIAN, April 1983). An earlier transition saw major anatomical changes as bullnecked, heavy-boned, massively muscled Neanderthals were replaced by more "gracile" Cro-Magnons, European representatives of modern *Homo sapiens sapiens* and physically among the weakest of all known hominids.

Did the newcomers evolve or immigrate?

For some time investigators have debated the origins of the newcomers, whether they evolved locally from European Neanderthals or emigrated from some other part of the world. The argument goes on, but opinion right now tends to stress outside origins, and the coming together of fossils and fossil experts helped bolster that view. Key evidence has been provided by one of the most unusual discoveries of recent times. In 1979 Bernard Vandermeersch of the University of Bordeaux, working at the Saint-Césaire rock shelter in western France, unearthed the bones of a Neanderthal, probably a female, and a burial, a rare enough find to start with. Even more surprising, however, was the date—about 33,000 years ago—because the Neanderthals were supposed to have become extinct before that.

In fact, some investigators doubted the existence of such a recent Neanderthal, and considered it a transitional form on the way to modern humans. Their doubts faded after examining a partial skull brought over by Vandermeersch, weakening the case for a western European group representing a stage between the Neanderthals and *Homo sapiens sapiens*. Furthermore, the case for outside origins was helped, for some, by a fossil from Israel. It indicates a relatively flat-faced transitional form. This reinforced the notion that Israel and the Near East in general, where a number of specimens have been found, rates as one plausible "Garden of Eden" region for the emergence of our kind of hominid.

Still unaccounted for is the dramatic shift in physiques, from a stocky, powerfully built form to taller and relatively slender individuals like ourselves. A typical Neanderthal male stood some five-and-a-half feet tall and weighed 175 pounds; a typical Cro-Magnon male weighed about the same, and measured almost six feet in height. According to the late François Bordes of the University of Bordeaux, "It was the difference between a wrestler and a decathlon track-and-field athlete."

Henry McHenry of University of California compares cast, left, and skull roughly 300,000 years old.

It seems to have been, in part, a matter of technology. Imagine people engaged to the hilt in close physical combat with a cornered reindeer or horse, coming in for the kill with repeated jabs using short-shafted spears and knives. We think of this in a general way as hunting, Neanderthal style. The style of Cro-Magnons involved action at a distance, less muscle and more finesse. They had the spear thrower (which imparts extra force to flint-tipped shafts and can kill from 30 or more feet away), the harpoon and probably the even deadlier bow and arrow.

As far as remote times are concerned, the search continues for more fossil evidence. Museum and laboratory vaults currently contain thousands of australopithecine and *Homo* specimens, representing more than 600 individuals, compared with about 400 several years ago. At the same time, each specimen yields more and more information as investigators focus on finer and finer details.

Pat Shipman of Johns Hopkins University deduces from tiny triangular and diamond-shaped markings on certain flat bone surfaces that people may have de-

Fred Smith of Tennessee, seated, and Karl Adam of Stuttgart, right, consider an archaic *Homo* skull.

veloped awl-and-anvil methods to punch holes in hides as much as one-and-a-half million years ago. Alan Walker, her colleague (and husband) at Hopkins, is working on telling the ages of young hominids at weaning by counting microscopic "bulges" inside the enamel of first molars as it built up day by day. Studies of the composition of ancient bone promise to yield information about the earliest use of fire and the relative proportions of meats and vegetables eaten.

Not that such meetings are all objective analysis. Far from it. At a dinner held in his honor, one story goes, Dart once announced: "Darwin's evolution of man was just a theory. I, Raymond Arthur Dart, have proved it!" and burst into tears. People tend to play it cooler nowadays, but the ego-spirit still holds. Being right in paleoanthropology, in anthropology generally, is not like being right in other branches of science. Being wrong is even more stressful (and far more common, as it must be in any expanding research field), resulting more than occasionally in ruffled feelings and feuding.

Bone fever remains a problem. Richard Leakey was conspicuous by his absence, and personalities probably had something to do with it. Furthermore, a few of those attending were obviously on a strictly nonspeaking basis, as they took pains not to cross paths. But the atmosphere encouraged a burying of hatchets; things were predominantly upbeat. Investigators who not long ago traded potshots in print met amicably and without fanfare over the fossils they had argued about.

In fact, the spirit of give-and-take was perhaps the most heartening feature of the meeting. Speaking of his discussions with Yoel Rak, Bernard Wood of the Middlesex Hospital Medical School in London had this to say: "I'd made three or four attempts to read his book on the australopithecine face, and finally abandoned it because I was getting nowhere fast. I like to measure things; he's very visual, very three-dimensional, and that's difficult for me. Rak's work is crucial to my own research, and yet I might never have understood it if we hadn't met with the fossils right there."

The flow of information in research on human evolution can be glacially slow. It may take a year to write up one's findings, another year or more for reviews and publication, and still more time for the inevitable criticisms and rebuttals. Face-to-face confrontations in New York helped to cut the process short, speeding exchanges of views by at least an order of magnitude. Assuming that the sooner we begin to understand our origins the better, that could be an event of evolutionary significance in itself.

Chimpanzee skull used for comparison with fossils shows some similarities, including size of the molars.

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A century

To help people with insomnia wake up to a bright new day, Upjohn searches deep within the mysteries of sleep.

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# of caring.

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Upjohn

Museum of Fine Arts, Springfield, Massachusetts

Private collection

Field's outlook seems dour in this portrait photograph, probably hand-colored by himself, taken about 1852.

Lincoln with Washington and his Generals includes, from the left, Burnside, Grant, Hayes and Arthur.

By Frank Getlein

A fantasy world from a stern-faced Yankee painter

Erastus Salisbury Field peddled his paintings door-to-door, yet his often eccentric visions of America were as inspired as they were bizarre

Erastus Salisbury Field until recently has been a one-picture painter, held firmly in that status not only by many histories of American art, but also by at least one plain history of America written for students below the graduate level. For such readers, Field's one picture —*Historical Monument of the American Republic* (pp. 64-65)—expressed both the high aspirations of the nation to which the readers belonged and, for the more advanced among them, a hint at least of the naive directness with which those lofty aspirations were sometimes pursued.

Revisionist history has long since disposed of both the aspirations and their pursuit. And now, thanks to the Museum of Fine Arts in Springfield, Massachusetts, which owns the painting, the one-picture view of Field has been expanded. More than a hundred other examples were brought together for a late-winter exhibition there. The show can now be seen through September 4 at the Smithsonian's National Museum of American Art and National Portrait Gallery in Washington. It will have a similar double booking in New York at the Metropolitan and the Museum of American Folk Art this fall, and will spend most of the winter at the Marion Koogler McNay Art Institute in San Antonio. The exhibition was organized by guest curator Mary Black, former director of the Abby Aldrich Rockefeller Folk Art Center in Williamsburg. She also wrote the text for the handsomely illustrated 116-page catalog.

By the end of the show's tour, a lot of Americans are going to know that there was more to Erastus Salisbury Field than just that one big picture—that he was, among other things, a professional portrait artist of observational intensity almost matching the visionary intensity of the Biblical, historical and emblematic scenes he derived mostly from popular prints.

Even so, that one picture is quite a picture. It is more than nine feet high and 13 feet wide, to begin with, and the title means exactly what it says. The picture itself is not the historical monument; the subject is. It is an astonishing architectural construction consisting of hundreds of figures, dozens of tableaux from American history, complete with angels and a demon, emblematic beasts and symbolic arrangements of columns of all kinds, most of them original in design, all arranged upon the surfaces, walls and terraces of ten mighty architectural towers. Begun in 1866, the visionary painting long antedates the first actual skyscrapers created by Louis Sullivan, and was 20 years ahead of the Eiffel Tower. On the other hand, although Field was painting the *Historical Monument* just as Roebling was bringing the suspension bridge to perfection in Cincinnati, the system of railroad bridges with operating steam engines and passenger cars connecting the towers gives but the slightest hint of the suspension principle and would likely have crashed to the ground.

Apparently Field believed that his historical monu-

Shelburne Museum, Vermont

Portrait of Clarissa Cook, about 1839, was found 100 years later in a Petersham, Massachusetts, dump.

Museum of Fine Arts, Springfield, Massachusetts

A medical missionary, the Rev. Dyer Ball, was painted just before his departure for lifelong work in China.

ment might actually be built someday. In the meantime, he proposed to gain a livelihood and to edify his fellow citizens by exhibiting the painting and explaining it to paying customers. In all this he was grievously disappointed. In the mid-1940s, the painting, rolled up and in terrible condition, was rescued from a shed behind a pigsty not far from where it had been painted in Plumtrees, Massachusetts, in the Connecticut Valley.

Field was a child of the valley, where he was born, along with a twin sister, in 1805. The family had been in the region for generations. Many of the *Monument*'s now obscure pre-Revolutionary incidents, formerly taught to New England grammar school students, involved his ancestors. As a boy he showed a talent for drawing and his father helped him arrange a brief apprenticeship with Samuel F. B. Morse (SMITHSONIAN, October 1982). He is best known as inventor of the telegraph, but at the time, 1824, he was a rising New York professional painter, active in artists' organizations, a founder and first president of the National Academy of Design.

In choosing portraiture as his branch of painting, young Field took himself at a stroke out of the rapidly gathering mainstream of 19th-century American art. Even while Field was absorbing the lessons of Morse's studio, Thomas Cole would soon be traveling along the Hudson and ensuring that 19th-century American art was going to be centered on landscape. Born and brought up in one of the loveliest landscape regions in the world, Field largely ignored it.

Portraits and a villain that slithered away

Returning from New York to the Connecticut Valley, Field took up an active life of more or less steady work painting portraits for patrons in several states. After demand for portraiture declined, Field turned to symbolic and historical subjects. About 1860, he embarked on such work with his versions of *The Garden of Eden*, seen with paired animals arranged in a fertile, well-watered valley plain, Adam looking on as Eve plucks the fateful apple and the serpent slithers away (p. 69).

Later, Field was to paint a series on the plagues of Egypt, including interior scenes looking remarkably like Victorian gatherings. After ex-President Grant visited India, Field executed a painting on the visit and related pictures on Indian subjects, including the Taj Mahal. In or around 1876, and again in the late 1880s, he made changes to bring the *Monument* up-to-date by placing what looks like Memorial Hall of the Philadelphia Centennial on top of the highest of the towers and by adding recent historical events.

Despite the adjustment and modernization, the big picture was not accepted for exhibition at the Centennial exposition in Philadelphia; in fact, it seems not even to have been seriously considered. This might have been a crushing blow, but Field, then 71,

Museum of Fine Arts, Boston

Portrait of niece Margaret Gilmore is believed to be Field's entry for 1845 annual fair in New York City.

refused to be crushed. He still had some 24 years of life left and lived them very much in the manner of his people. He built things with his hands. He hawked small memorial artworks from door to door on the occasion, for example, of the death of President Garfield. He chopped his own wood for house and studio. On Sundays he walked two miles to the church in North Amherst, refusing lifts because the noises of the horse and carriage disturbed his meditations. Regarded with affectionate tolerance, independent, eccentric, Field lived to be the oldest resident of his county and died just after the end of the century, the last of a valuable American breed.

Perhaps, outside Italy, all artists in small towns are

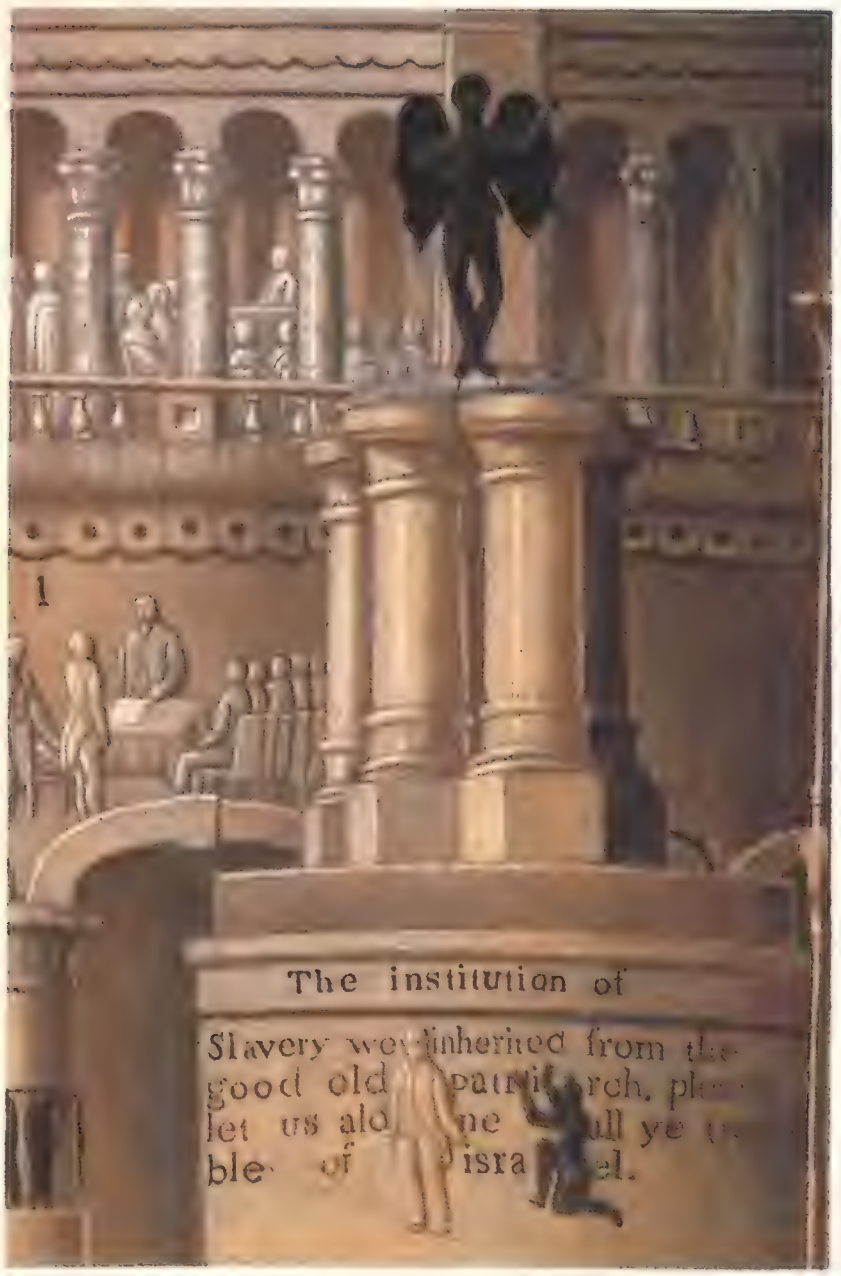
Critic Frank Getlein, author of 24 books on art, last wrote on Precisionists, SMITHSONIAN, *June 1982.*

Overleaf: Historical Monument of American Republic

Museum of Fine Arts, Springfield, Massachusetts

Details from an antic masterpiece

Troops march as nation celebrates 1876 Centennial in detail from *Historical Monument*. Relief framed by paean to Bible shows landing of Pilgrims at Plymouth.



Painted to look like a bas-relief, scene on the left tower shows the English settlers hefting logs for shelter after landing in 1607 at Jamestown, Virginia.

Field was obsessed with the issue of slavery; its "oppression, fraud, violence and every evil" are symbolized by the winged Satan at top.

Towers, crowned with columns signifying states and standing on "The True Base" (T.T.B.) of Constitution, are connected by railroad bridges high in the sky.

Field depicted little-known incidents in American Revolution such as the public burning of British document, left, and raising of the colors, at right.

Beneath Revolutionary battle scenes, the artist showed Signing of the Declaration of Independence, center, and First Continental Congress, below.

Field put Booth shooting Lincoln (with Washington looking on in astonishment) in the center of *Historical Monument* to underscore the gravity of the deed.

An eccentric Yankee painter

regarded as eccentric. At any rate, as the current exhibition was being prepared, that was the memory that remained of him in Plumtrees, the place where he spent the last decades of his long life.

People recalled with affection a friendly old man, strong and healthy despite his years, who entertained them after school, during vacations and sometimes even during recess, by exhibiting his edifying paintings. A favorite was his panorama, 12 inches high by 80 feet long, of a trip around the world, featuring Boston and Constantinople.

Some of the remembered eccentricities were clearly the result of need—you might say poverty, except that poverty was an idea almost unacknowledged among the New Englanders of the artist's heritage. There was a decline in demand for portraits painted by hand as photography became more varied, more practicable and more universally available.

Field faced an increasingly uncertain livelihood. As his straits worsened, and he came to depend on his daughter Henrietta and the kindness of old family patrons, his ambitions soared. He determined to build a mansion fit for a great artist. This led to an excavation, straight down, intended as the cellar for the building which was never built.

Besides such endeavors, twice a day the old man fetched two buckets of water on a polished wooden yoke across his shoulders. He farmed a little and did his own sugaring, retreating to the subsistence practices of his agricultural ancestors.

He was remembered by a then-small relative as no taller than herself at age nine. That must have helped ingratiate him with the children.

Despite the loftiness of his artistic ambitions as expressed in the *Monument* and in other similar works, probably Field's most enduring value is as the painter of those stern and rockbound faces he grew up among and was kin to himself. Like many naive painters—and such he must be reckoned for all his brief exposure to the sophistications of New York—Field created often enchanting flat patterns out of the gowns and beads of his lady sitters, their ringleted locks and lace-fringed caps and collars. Such details assuredly reproduce reality, yet in Field's hands they don't quite curl into three-dimensionality. Instead, they lie upon the real surface, the flat of the canvas, and enchant by existing in two planes, thus two realities, simultaneously.

You can see this in the portraits of *Louisa (Clarissa?) Gallond Cook* (p. 62), of *Mrs. Pearce*, and of the wonderfully pyramidal *Dolly Floyd Wiley* with her very up-to-date accordion, invented only eight years earlier. Incidentally, all three ladies share the short waist that was either characteristic of people in the middle Connecticut Valley or a consistent inability of Field's to come to grips with that section of anatomy. In contrast, Margaret Gilmore is so long-waisted as to seem to be standing up, her legs before her like a draped and flounced shopping cart (p. 63).

Yet, despite these shortcomings, in all these cases and most others, the solid character of the sitters, sometimes even the mood of the moment, holds everything together. We admire the earnest integrity of *The Reverend Dyer Ball* (p. 62); sympathize with the mournful boredom of the *Boy on Stenciled Carpet*, stuck as he is with some endless exercise in rote learning; respond to the Yankee nomenclature and Yankee plainness of *Thankful Field Field.*

Preposterous and miniaturized Generals

The set pieces aren't remotely in this class. *The Last Supper* is, after all excuses, a travesty on Leonardo da Vinci, however deeply and unquestionably sincere its Christian piety. Patriotic piety fails to save *Lincoln with Washington and his Generals* (pp. 60-61) from being faintly ludicrous, what with the preposterous Ambrose Burnside favored over the miniaturized Grant, the absence of Generals Sherman and Sheridan and the presence of, of all people, Rutherford B. Hayes and Chester A. Arthur.

The *Historical Monument* is in a class by itself in art, like the Spruce Goose of Howard Hughes in aviation and Erich von Stroheim's *Greed* in movies: all three suffered from the overweening grandiosity of their creators' ambitions, yet all three, in part because of that grandiosity, somehow overcome it to commend themselves to our attention, curiosity and eventually, even if reluctantly given, admiration and respect. With all of its architectural eccentricities, the *Monument* speaks, even today, with appropriate dignity and reverence of our beginnings and the men who made those beginnings.

For the Museum of Fine Arts in Springfield, where the exhibition originated, it is, of course, an act of regional piety and perhaps of reparation to a venerable artist of the area whose high hopes were crushed and who sank through the last quarter-century of his long life, keeping out of destitution by daily hard work at his art, his survival farming and, to the end, his instruction of the young with the means at hand. In addition, as Springfield museum director Richard Mühlberger wrote, "We have made an addition to folk art studies [and advanced] the study and appreciation of American art in general. . . . The work of Erastus Salisbury Field transcends categorization . . . his masterpieces will be numbered among those icons of art that have become a part of our national consciousness."

For the Smithsonian this first joint venture of the National Portrait Gallery and the National Museum of American Art is important because their directors hope to continue to join forces in the activities of the two museums. Alan Fern at the Portrait Gallery feels that the special viewpoints of the two institutions can be combined to give a new resonance to the study of American art. Charles C. Eldredge at American Art agrees. Eldredge also looks forward to more exhibitions like "Erastus Salisbury Field" that deal with naive art, which is largely outside the academic mainstream. "This individual, untutored strain has much to tell us," he says. "It delights us as well."

Field was deeply attracted to Biblical and historical subjects and he painted many of them late in his life. His *Garden of Eden*, c. 1860, was influenced by English artist John Martin and the American, Thomas Cole.

Shelburne Museum, Vermont

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LINCOLN-MERCURY DIVISION Ford

By Israel Shenker

The Lords of Alnwick, a castle great with art and history

Heir to the largest landholding in the north of England, the Duke of Northumberland presides over much treasure and tradition

The 10th Duke, Hugh Algernon Percy, shares a castle bench with his Duchess, the Lady Elizabeth.

Seat of the Percy family's power since 1309, Alnwick Castle sits in green fields beside the river Aln.

Friends call him Hughie, but Hugh Algernon Percy is also distinguished as 10th Duke of Northumberland, Earl of Northumberland, Baron Warkworth, Earl Percy, Earl of Beverley, Baron Percy and Lord Lovaine, Baron of Alnwick. He is a Knight of the Garter, Grand Cross of the Royal Victorian Order, Privy Councillor, the very incarnation of royal favor and aristocratic loyalty. At the coronation of Queen Elizabeth II it was the Duke who was chosen for the honor of carrying the Sword of Mercy, called that because its tip is broken off.

In 1973 the Queen asked him to be Lord Steward of the Royal Household, and—like a common mortal—he wondered what that was all about. So he asked the Lord Chamberlain, and was relieved to learn that the office no longer bore the burdens of the time when the Lord Steward was responsible for seeing that fires were

Photographs by Erich Lessing

The 10th Earl of Northumberland was painted by Van Dyck in 1637 as Lord High Admiral of England.

1st Duke, Sir Hugh Smithson, married into the Percy family in 1740 and renovated the castle in Gothic style.

laid and the Lord Chamberlain was responsible for seeing that they were lit.

These days the Lord Steward leaves the dross of duty to the full-time Master of the Household, and sticks to pomp, strictly part time. He turns up for the opening of Parliament, arriving in the coach immediately behind the Queen's carriage, along with the Mistress of the Robes and the Master of the Horse. On State Visits he helps receive the guests, then leads Her Majesty to the State Banquet, walking backward, darting looks behind him to make sure he doesn't trip over a footman or impale himself on an unbroken sword. "As long as you're careful what you drink beforehand," he notes. "Once you're on the straight, there's usually a carpet to guide you."

The 70-year-old Duke presides over an establishment grandiose even by the standards of ancient aristocracy, but disarmingly confronts the world with self-deprecating British humor. He lives in a great castle that knew centuries of classic warfare and now resolutely withstands the assaults of modern taxation. Within its imposing sandstone walls Alnwick (pronounced "anneck") Castle has a wealth of family portraits, priceless historic mementos and one of the world's great private collections of art accumulated by succeeding generations of the family. It includes works by Tintoretto, Titian, Andrea del Sarto, Claude Lorrain, Anthony Van Dyck, Turner and Canaletto.

It is also a living museum and a public showplace, which draws more than 85,000 visitors a year who stroll in its walled park and are awed by its storybook towers, as well as by the paintings, Roman artifacts and a gleaming collection of arms and armor. Though the castle is drenched in British history, Alnwick and the Percy family have a lively American connection. Under terms recently reached with the 10th Duke, 200 students from St. Cloud State University in St. Cloud, Minnesota, get to spend a term or two each year living in the castle and using its spectacular 16,000-volume library as a base for special studies.

4th Duke served in Napoleonic wars, then acquired many of Alnwick's Italian paintings and objets d'art.

Present Duke had his portrait painted in hunter's pink upon the occasion of his marriage in 1946.

A strong Percy link with America goes back much further, to the 18th century, and to two sons of the 1st Duke of Northumberland. One son, Earl Percy, who later became the 2nd Duke, commanded British troops during the retreat from the battle of Lexington in 1775. The other link is more cheerful, because it was the other son, James Smithson, who left the great sum of money that eventually led to the founding of the Smithsonian Institution in 1846. The Smithsonian connection is still very much alive. This month, for example, after opening the special Smithsonian exhibits at the Edinburgh Festival over the border in Scotland (p. 136), members of the Institution's Board of Regents and of its National Associates Board will take tea with the Duke and tour the castle.

The Percy family has played a leading role in many of the proudest, as well as in some of the more ambiguous, events of British history—social upheavals, wars and usurpations. The 10th Duke is a soft-spoken, deliberate man. Unlike some predecessors (most notably Henry Percy, Shakespeare's Hotspur) who rebelled against King Henry IV, he is prepared to accept his station. An Act of Parliament of Henry VIII suggested that on ceremonial occasions the Lord Steward took precedence over the Lord Chamberlain; under George V a committee suggested otherwise, but tiffs over status still led to unseemly pushing. Jostling for position is not the Duke's way. Looking backward comes naturally, though, as it does to Britain's hereditary peerage generally. The Duke is hardly impressed by those who boast of ancestors arriving with William the Conqueror in 1066. "If they did but know it," he says, "the people who came over were all the rapscallion younger sons."

William endowed the family with great property, and they delighted in improving on royal grants. In

Israel Shenker writes frequently for SMITHSONIAN, *most recently in articles about Great Britain's Royal Warrants and Gilbert and Sullivan on TV.*

A castle great with art and history

A warrior family's precious relic: uniform worn by Major Henry Percy when he carried news of Waterloo.

1309 Henry de Percy staked his claim to hegemony in Northumberland, the wild eastern border region adjoining Scotland, by purchasing Alnwick Castle. The Percys strengthened Alnwick's defenses, making it the most awesome fortress on the English side of the border. Encouraged by their monarchs and restrained only fitfully by fear of revenge, Scots and English were forever crossing into hostile territory to raid, loot, burn and slaughter.

The English border area was the province of feudal power, with great lords like the Percys serving their sovereigns as strong-willed mercenaries when not contesting the authority of the Crown. In the northern Marches the most powerful lords were designated Wardens and charged with maintaining security, harassing enemies and enforcing laws indulgent toward killing but not toward "border treason"—which usually meant helping Scots, failing to resist them or marrying them.

Henry, 1st Lord Percy of Alnwick, fought for his King against the Scots, then joined the rising against Edward II. The Percy estates were confiscated, then restored. "Somebody rebelled and then his lands were taken by the monarch and given to somebody else," says the 10th Duke of Northumberland, with the air of someone who accepts the ways of the world. "They had the most bloody awful time."

In the Hundred Years War, which began in 1337, the 2nd Lord Percy took time off from fighting Scots to serve England against France. When Edward III burned Edinburgh and laid the Scottish countryside waste in the Burnt Candlemas campaign, the 3rd Lord Percy was with him. And when the Scots pursued their tormentors into England, it was Northumberland that suffered the consequences.

At the coronation of Richard II in 1377, the 4th Lord Percy officiated as Marshal of England, and was created 1st Earl of Northumberland. In fighting against Scotland, one of his most daring soldiers was his 14-year-old son, now famous as Hotspur. Legend holds that the guttural Northumbrian speech began with Hotspur, and literature offers a striking portrait of a proud father and spirited son in *Henry IV, Part I*. Shakespeare's Prince of Wales describes Hotspur as "he that kills me some six or seven dozen Scots at a breakfast, washes his hands, and says to his wife, 'Fie upon this quiet life! I want work!' "

In reality as well as on stage, loyalty was fitful, treason routine, life hazardous, ambition implacable. Earl Percy joined other nobles in rebellion. They deposed King Richard II, replacing him with Henry Bolingbroke, who became Henry IV. The Rising of the Percys, in 1403, led to the unfortunate Battle of Shrewsbury. Hotspur, overpowered by Henry's forces, lost his life, and his head was fixed to one of the gates of York. Of course the Earl eventually rose against Henry IV—who forthwith seized the Percy holdings. "Harry Hotspur's son was reinstated in all his estates by Henry V," says the 10th Duke.

The Percys chose wrong in the 15th-century War of the Roses, which pitted the House of York (whose badge was a white rose) against the red rose of Lancaster for the Crown of England. The 3rd Earl of Northumberland led the Lancastrians through a blinding snowstorm straight to defeat in the Battle of Towton, the bloodiest ever fought in Britain, with some 38,000 dead, including the Earl. But in 1469 the King restored both earldom and estates to the Percys again, and the new and grateful Earl returned the favor by murdering Scots.

The Percys were often vexed in love as well as war. For example, the Duke explains, "The 6th Earl (The Unthrifty) led a miserable life, having fallen in love with Anne Boleyn." When Henry VIII decided to monopolize Anne's affections, casting off his first wife, breaking with Catholicism and starting his own Church, the 6th Earl had to cool his ardor. His pangs are memorialized in lines that may have come from his own pen:

> What's life to me, Northumberland's proud heir?
> Life without her is life without a sun;
> Why should the fates thus ever place me here?
> Why am I doomed life's cheerless course to run?

When Anne Boleyn, having run the course as the King's second wife, was charged with adultery and incest, the King ordered the Earl to be one of her judges. He got off by pleading illness.

Simple Tom, the 7th Earl, supported the claims of Catholic Mary Queen of Scots to the English throne, but begged off entertaining her at Alnwick, maintaining that he didn't have £40 to his name, and pleading that the castle was "utterly unfurnished and [had] not so much as one bed in it." But Simple Tom nevertheless took part in the Rising of the North against Queen Elizabeth, and was beheaded.

Two Earls were imprisoned in the Tower

The 8th Earl (the ruthless Cruel Henry) professed Protestantism but was suspected of secret Romanism and repeatedly imprisoned in the Tower. In 1585 he was found there shot through the heart and a couple of other places. The verdict of suicide seemed excessive, but his timely end served his family nobly, since it prevented forfeiture of the family property.

Scotland's James VI came to the English throne (as James I) with the help of the 9th Earl. The Earl's Catholic cousin Thomas Percy rented a cellar below the House of Lords, and 36 barrels of gunpowder were stored in preparation for blowing the place up on the Fifth of November 1605. Wrongly accused of collusion in the Gunpowder Plot, which gave Britons Guy Fawkes Day, the Earl was imprisoned in the Tower and

Tiny gloves were used at crowning of Edward VI, who reigned as King of England only from ages 9 to 15.

Alnwick treasures include portable cutlery which was carried by Edward's half sister, Queen Elizabeth I.

Percys backed Elizabeth's rival, Mary Queen of Scots, now have her pincushion and hairnet made of her hair.

More than baronial splendor shows in castle dining room, hung mostly with imposing family portraits.

ordered to pay a fine of £30,000. He pleaded: "My Estate is not such as perhaps the World takes it for; my Debts are greater than is believed, and there is a Companie of little ones to provide for, which lies uppon my Handes." The King may have been moved, but the Earl stayed put for 15 years, running his estates from his prison apartment and continuing to protest his wife's profligacy. "Wives are commonly great scratchers after their husbands' deaths, if things be loose," he warned.

When the 11th Earl died in 1670, the earldom became extinct. Elizabeth, a three-year-old daughter, succeeded as Baroness Percy. By age 16, already twice-widowed, she married the 6th Duke of Somerset, known as the Proud Duke. With Somerset's death in 1748, his son was confirmed as Earl of Northumberland, but only with the stipulation that the title would thereafter pass to his son-in-law, Sir Hugh Smithson, whose wife, a Percy, had inherited the Northumberland property.

On acquiring the earldom, Sir Hugh assumed the Percy name and arms. He served as Lord Chamberlain to Queen Charlotte, Lord Lieutenant of Ireland, Master of the Horse, and in 1766 George III—who had wanted him as Prime Minister—made him 1st Duke of Northumberland. The Duke rivaled his wife, a Lady of the Bedchamber, in splendor. A friend described him at dinner as "nothing but fur and diamonds."

A legacy to the United States of America

It was he who started the restoration of Alnwick Castle, and with the help of architect Robert Adam he made it a neo-Gothic showplace, all according to the reigning vogue. He also set Adam to work improving great Syon House on the Thames, which the family had acquired two centuries earlier. At a party there, the King of Denmark asked if it wasn't difficult to light 4,000 lamps at once. The Duke said it was no problem—he had 200 lamplighters.

It was his son, later the 2nd Duke, who commanded the troops covering the British retreat at the Battle of Lexington in 1775, afterward reporting: "Whoever looks upon [American rebels] as an irregular mob, will find himself much mistaken."

The 1st Duke had another son, James Smithson, born out of wedlock, and—like his half brother—destined to affect the fate of distant America. The natural son never married, leaving his estate to a nephew, but insisting that if the nephew died childless the legacy was to go "to the United States of America, to found at Washington, under the name of the Smithsonian Institution, an Establishment for the increase & diffusion of knowledge among men." The nephew died childless, and the rest is history.

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Mosaic-floored Guard Chamber is in Neoclassic style, with marble statues of *Justice* (left) and *Britannia*.

Algernon, the 4th Duke of Northumberland, served in the French wars from 1804 to 1815, retired as an admiral, then traveled through Africa, the Middle East and, especially, Italy. Observing that it was possible to furnish the interior of a rough-hewn medieval stronghold with the lavish, ornate products of the Renaissance, he imported Italian art and expertise to transform Alnwick.

In 1940, Henry George Alan, the 9th Duke, was killed during the British retreat to Dunkirk. And thus his brother, the present Duke, who had not expected to succeed, became 10th of the line.

At the onset of World War II, in 1939, he had been studying to be a barrister. "One imagined one would be all sorts of great men rolled into one," he says, to explain his choice of the law. "The sort of thing where you sink or swim on your own, not like the army or the civil service where you go up automatically unless you make an awful blob."

The Duke served with the Northumberland Hussars as an officer in Greece and in the Western Desert. He later served in the War Office in London. "We were called up on horseback in 1939," he recalls. "Thank God we had our horses taken away. Army life was a very good life, when you weren't being frightened."

After the war, he took over the management of the Northumberland and Syon Estates. He served for ten years as Chairman of the Agricultural Research Council, as well as on the agricultural committee of the National Development Organization. He has been a member of the Northumberland County Council and for 20 years Chancellor of Newcastle University. The Duke was a Conservative whip—party disciplinarian—in the House of Lords. When appointed the Queen's Lord Lieutenant for Northumberland, he dropped overt politics, though remaining a loyal Tory. If any of his six children came to announce a switch to Labor, the Duke was prepared to react by saying: "How interesting! Do tell me why."

"I can remember when there were 20 housemaids"

He is master of the Percy Hounds, and hunts twice a week during the season, November through March. During the shooting season, from August through January, when time permits, he goes after game birds. At Alnwick the Duke enjoys a cosseted austerity—only one working open fire—that would have astonished his forebears. To care for the Duke and Duchess and their 31-year-old eldest son, there is no resident staff. Cook, housekeeper, butler, secretary and chauffeur all live out. "The cleaning is done by ladies who come in from the town—that's the one benefit of being on the edge of town," says the Duke. "I can remember when there were 20 housemaids, a housekeeper, butler, valet, perhaps two footmen, kitchen staff and even still-room maids. I'm not sure what a still-room maid did—made jams and things, I think."

Northumberland has more castles and fortified places than any other English county, but it is also the least populous. The present Northumberland Estates cover about 100,000 acres including 7,000 acres of productive woodland. There are about 140 tenanted farms. At Alnwick, a 9.5-mile-long wall encloses the Duke's Park, open to the public on request and at fixed times. The Duke enjoys the custom of employing a personal piper, and by tradition he gets the first salmon each year from the Coquet River. "I eat it—quickly," he says. The family used to draw great royalties from coal mined on ducal property, but coal has long since been nationalized. There are still quarries and forests producing for the Percys.

The castle provides revenue of its own, thanks to visitors paying for access to a series of state rooms while skirting the quarters assigned to the undergraduates from St. Cloud. Atop the walls stand guardian figures of stone, some authentic medieval, some faithful reproductions. Within the entrance hall the walls are virtually carpeted with arms and armor—

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The 1st Duke's son, James Smithson, left $500,000 to found what became the Smithsonian Institution.

halberds, swords, pistols, powder horns, much going back to the Percy Tenantry Volunteers recruited by the 2nd Duke when Napoleon was threatening invasion and nursemaids used to threaten their unruly charges with the thought.

Beyond the entrance lies much art and historic artifact. Among the curious memorabilia are nightcaps of Cromwell and Charles the Second, and hair of Mary, Queen of Scots. The 10th Duke, who believes his collection includes some of the finest works by the artists represented, calls his holdings "typical of many English country-house collections."

"I'm not an art historian," says the Duke. "I think I probably could tell the difference between a Titian and a non-Titian, but I wouldn't like to go to the stake on it." The great library is bedecked with books of rarity and a television set of the common variety. Individual window-shutter panels took a workman a year each to complete; one 19th-century marquetry table was 11 years in the making.

One of the greatest treasures, the 13th-century Sherborne Missal, acquired for £200 early in the last century, is on loan to the British Library. "A thing like that has become so valuable," says the Duke. "You can't have it out to show to the public, and it ought to have a page turned each day. It won't do it any good to be turned, unless you have a real expert to do it."

The duties of stewardship are similar to those of a museum director—preservation and restoration. On the death of their owner, great historic works of art can pass to the heirs exempt of capital transfer tax. The Duke is free to sell oddments for pocket money. He calls it "culling." Periodically he has sold prints, porcelain, about 1,000 Roman coins (auctioned in 1982 for about $300,000), Victorian fire screens and settees, medals ($600,000 in 1980) and South African Cape wine dating back to 1791. In May he sold bits and pieces at Sotheby's for a total of $1,320,000, and that included the world-record price for a piece of silver—$680,000 for a 19th-century shield of Achilles designed by sculptor John Flaxman.

The Percys spend about ten weeks each summer at Syon, the last great patrician house in the London area that is privately owned. Catherine Howard, fifth Queen Consort of Henry VIII, was imprisoned there before her beheading in 1542. Five years later Henry VIII reposed there in his coffin, en route to Windsor. After the First World War, Prime Minister Lloyd George wanted to extradite the Kaiser from Holland and lodge him at Syon—to be daily taken down the Thames for trial at Westminster Hall, where Charles I was condemned in 1649. Today Syon House draws about 25,000 visitors from Easter through September. Designed by Lancelot (Capability) Brown (SMITHSONIAN, August 1978), the gardens are open the year round and attract close to 80,000 visitors. The Duke runs a garden center nearby, selling plants, seeds, fertilizer, garden tools, pesticides and insecticides. "Turnover was more than a million pounds last year," he says of the enterprise.

This is a far cry from the accounts of former Percys, who were less accustomed to fighting crabgrass and slugs, but times have changed. "The power of government is such that to start a rebellion would be very difficult now," the Duke observes.

Now and then he does complain of his trials at Alnwick. "How many people now would want to take on a place like this? Rather have a modern kitchen. The idea that it's all perfectly comfortable is a little short of the mark, especially if you have 85,000 people wandering through here, as you have during six months of the year."

When he was asked if he would really prefer a cottage, he rejoined: "You haven't got to go from a place where you can put 200 people up—to a cottage. You can have a very pleasant small house."

Part of arms collection is sword (center) of Lord Henry Percy, who won the Victoria Cross in Crimean War.

Illustrations by Brenda Losey

"Fanny and Rosey were both in awe of the kitchen.
Neither had ever seen anything so terrifyingly modern.

The room's centerpiece was a black monster unlike anything the girls had ever seen: a cast-iron cookstove."

By Shirley Abbott

The epic tale of one noonday meal, hot and on time

How easy it sounds, but how hard it was to do, for a bride in Manhattan in 1855 with a new husband and an imposing stove

There are times, as anyone knows, when the collapse of a soufflé can be as catastrophic as the fall of Rome. And in the mid-19th century the trials of a housewife could be anguishing indeed, even with the help and counsel of Home Cookery *by Mrs. J. Chadwick and* Ladies' Indispensable Companion. *These two historic books, which contained almost all there was to know about domestic problems—from preparing puddings to teething ("lance the gums of the child")—have just been reissued by Oxmoor House in a single volume. The following story of Fanny Van Courtlandt's hectic noon meal, a fictional yet authentic account of how things were for a hard-pressed young wife in the 1850s, has been adapted from the Introduction.*

Every story needs a heroine, and imagine the heroine of this one as a bride of one month, age 20. In June 1855 she came to live in Manhattan as the wife of Charles Algernon Van Courtlandt, the ambitious new junior partner in the dry-goods importing business run by his uncle, Henry Van Courtlandt. Caroline Frances was her name, but everyone called her Fanny except her husband, who called her Mrs. Van Courtlandt. That was, after all, her proper title, and Charles took pride in his polished manners, as well as in his pretty new wife, and Fanny loved the "Mrs." Their household servant Rosey, age 16, was just off the boat from Cork. She called her new employer Mrs. Van.

Maid and mistress had laid eyes on each other for the first time when Charles and Fanny came home on their

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The horrors of housekeeping in 1855

wedding day. Rosey had been waiting for hours in the front hall, weeping from dread. Would the new lady like her? Beat her? But Mrs. Van turned out to be quite human, and almost as inexperienced as Rosey herself. Fanny had grown up on her parents' prosperous dairy farm on the Cow Neck peninsula in western Long Island. She was not accustomed to servants but, as the eldest daughter, she knew about hard work. Her mother had sometimes hired a girl, but only by days and only when she was lying-in, which was often: Fanny was one of ten. Fanny liked the outdoor work better than the cooking and sweeping. But she was a fine embroiderer and she *could* bake bread.

Charles had offered her a better situation in life than she had dreamed possible. His Uncle Henry, a successful importer, was about to open a fancy new carriage-trade store on Broadway, where he planned to sell fine silks from the looms of France and cottons from England. Charles and his younger cousin Samuel were to come into the firm as junior partners. And to spare the newlyweds the ignominy of living in a boardinghouse, Uncle Henry had generously advanced the money for them to set up housekeeping—provided only that they should live near the store so that Uncle Henry could dine with them daily and that Cousin Samuel could occupy their spare bedroom. Charles had fitted out the house down to the last spoon, for he wanted a home to reflect his present and future position.

"On the fateful morning, Fanny sat in the front parlor, more or less like the lady she knew she must be."

Fanny and Rosey were as one in their awe of the kitchen in the basement of the Van Courtlandt town house. Neither had ever seen anything so terrifyingly modern. Rosey had learned to cook over a peat fire, out in the open, and Fanny had learned to cook on an open hearth in the ample kitchen of her parents' house. This kitchen was much smaller than her mother's; it had a fireplace of modest dimensions for the spitting and roasting of meats, but the room's centerpiece was a black monster unlike anything the girls had ever seen: a cast-iron cookstove. Attached to the back of it was a good-sized water tank with a little spigot: hot running water for all kitchen uses, so long as the fire stayed bright and you remembered to fill the tank! The cook top was like a small table with five lids, and there were two little doors on the sides for adding the firewood.

Fanny's first thought was that with such a stove you could cook standing up, rather than bending into the fireplace or stooping to pile hot coals around the Dutch ovens on the hearth, as her mother had done. A great improvement, she thought, and Charles reminded her, with some satisfaction, that the stove used half as much firewood as an open hearth and would pay for itself (it had cost him $8) within a year or so. And what seemed more miraculous than the stove was the sink on the wall with its water pump—fresh, pure water piped right into the house. According to Charles, it came from the Croton Reservoir, many miles to the north.

The table was stacked with pots and skillets

Fanny was dubious. But at least they need not draw water from a well or buy it from a street vendor. And on a worktable next to the sink was stacked an array of gleaming new kettles, pots and skillets in cast iron, britannia and tinware, and a butcher knife, muffin rings, pudding bags, a rolling pin, an apple peeler—everything the cook could want. Fanny's heart sank. Where were the hooks and cranes, the familiar brick ovens, the toasting racks of Mama's kitchen?

On the fateful morning of which we write, Fanny sat

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THE ONE TO WATCH

"Yesterday they dined on Rosey's burned beefsteak and a leaden, gray pudding. But Cousin Samuel had uncomplainingly eaten every bite. 'Why don't we go to Delmonico's tomorrow?' he proposed. Henry glared."

not in her kitchen but in the front parlor, more or less like the lady she knew she must be. Lady or no lady, dinner had to be ready for the Van Courtlandt menfolks promptly at 1 o'clock. So far Fanny had done rather poorly in the dinner department. Yesterday they had dined on Rosey's burned beefsteak and a leaden, gray pudding. Uncle Henry had eaten a quantity of bread and butter, Charles had grimly swallowed the steak and rejected the pudding. Cousin Samuel had uncomplainingly eaten every bite, smiling down the table at Fanny in a provoking manner. (He was quite dark and handsome like Charles, but being only 22, had not yet decided to cultivate a mustache.) "Why don't we all go to Delmonico's tomorrow?" he proposed. Henry glared at him.

That evening Charles had spoken solemnly to Fanny about the serious nature of domestic responsibility:

"You cannot leave everything, indeed anything, to Rosey, for she is stupid and untrained. You cannot expect to spend your mornings at your needlework—your happiness can only come from the proper performance of your duties. I provide you with every comfort. Surely you can, in return, provide my uncle and Cousin Samuel and me with a palatable noonday meal, served hot and on time. Need I remind you by whose generosity we acquired this house and its furnishings?"

Fanny's cheeks had burned, and the cooling tears had rolled down them (just like the tears of the heroines in *Godey's Lady's Book* fiction), but whether she was ashamed or merely angry she couldn't have said. One objection to Charles that Fanny's mother had raised was that, although he was only five-and-twenty, he was as serious as a parson.

But today she was making a new beginning. It was only 9 o'clock, and getting hot. She rolled down her stockings and propped her feet up. Charles had speci-

Shirley Abbott is author of Womenfolks, Growing Up Down South, *a book about the role and responsibilities of women (and ladies) in the Old South and the New.*

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fied mutton soup, fish cakes, veal chops, a pudding of some description, chocolate cream for dessert, and of course bread and butter on the side. Not a complicated dinner, he pointed out, modest in comparison with the fare Uncle Henry expected at home. Surely Fanny could produce such simple, basic dishes. Leafing anxiously through her cookbooks, Fanny ignored the ominous sounds from the kitchen below. Rosey was talking to herself and banging the stove door. Had the fire gone out again? Fanny must not think of it: she must find a pudding recipe.

At eight that morning Fanny had set the mutton soup to cook, or had attempted to, while Rosey dusted the upstairs bedrooms, carried out the slops and turned the bedclothes out to air. "Take a leg of mutton weighing five or six pounds, put it in a nicely cleaned pot, and a little more than cover it with boiling water." Plain enough, Mrs. Chadwick. Fanny had pried the heavy joint from the icebox, noticing as she did so that the pan was running over onto the floor. On her knees, with the mutton balanced on one hand, she raised the wooden flap that hid the water pan, noting that it was not only full but slimy, which explained the sour smell. The block of ice had melted away in the night, and the meat was hardly cold at all. She sniffed the mutton suspiciously. Not too bad, if she could get it cooking fast enough. She would set Rosey to cleaning the icebox, if the dusting ever got done. Dumping the mutton into a soup kettle, Fanny turned to the great black stove. Pride of the household. It was just about warm enough to melt butter.

She covered the meat with tepid water from the tank and set the heavy pot on the range top. She could see that Rosey had cleaned out the ashes, had even brushed

"Yet 'shiftless' was hardly the word for Rosey as she walked behind Fanny in the busy market, lugging heavy baskets, or scrubbed the kitchen floor, her bony fingers clutching the scrub brush like lobster claws."

down the sides of the firebox, and had laid a nice, compact little fire, which now, inexplicably, smoldered and smoked. Had the kindling been wet? Probably. And the woodbox was empty. Fanny went to the cellar and came back with an armload of wood and the phosphorous matches. These, too, were a modern convenience and a great blessing when they did not explode in your face or shower your apron with sparks. (Faced with a cold hearth in Long Island, her mother would have had to walk to the next farm for live coals.) Fanny watched long enough to see the flames rise, then returned to Mrs. Chadwick.

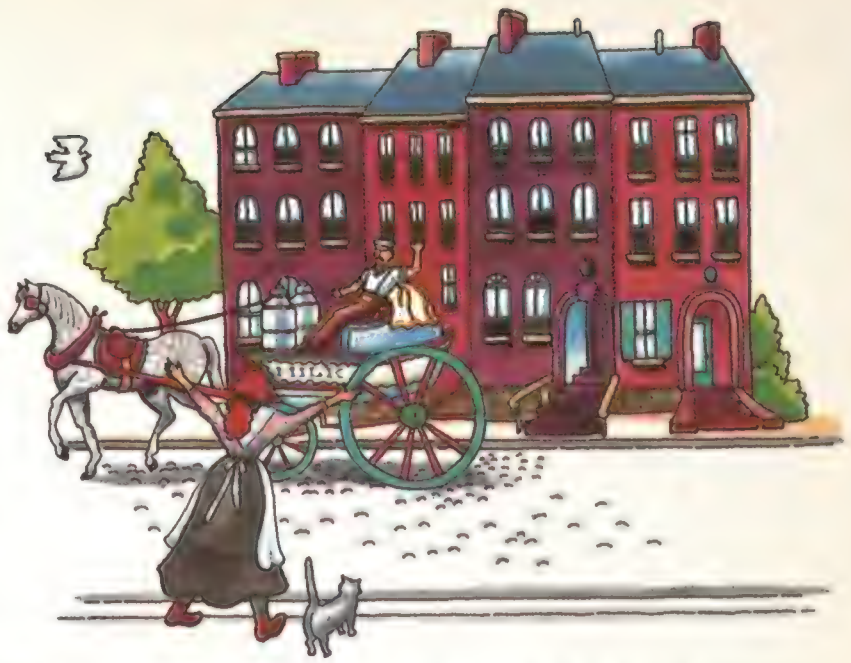
"Put in a bunch of carrots, four turnips, two onions, a small cup of rice, and some salt." Having come this far, Fanny discovered that Mrs. C. had wanted the vegetables boiled before the meat was added, but perhaps Mrs. C. (and Charles) wouldn't know the difference. The vegetables had to come from the cellar. Fanny descended the stairs once more, fetched the vegetables, peeled them and soon had the soup on to boil. To boil? The stove by then was almost cool enough to touch. Flinging the side door open and bending to inspect, Fanny could see no cause. Again she restacked the wood, this time with more plentiful kindling, lit the match, blew on the flames and retreated hopefully upstairs to the parlor. Why did the smell of stewing mutton and onions not fill the house?

"Rosey, what has happened to the fire?"

Again, the sound of muttering and banging. "Rosey!" Silence. Fanny went to the top of the kitchen stairs. "Rosey, what has happened to the fire? Is the soup boiling?" "Bless you, ma'am," the cheerful cry came back, "I got her going now. She'll be red-hot in no time." Rosey's thick brogue was pleasant to hear, though Charles disliked it, wishing they had an English maid instead. But everybody hired the Irish now—almost one million of them had come to America in a single decade, driven by famine at home, by desperation, by hope. Rosey earned $4 a month and her keep, and sent $1 a month home to her younger sister in Ireland who was saving for her passage.

The ladies in the neighborhood joked about their Irish hired help, called them shiftless and dirty. And it was true that unless Fanny scolded her daily, Rosey never thought to change her dirty apron, which disgusted Charles. Yet shiftless was hardly the word for Rosey as she walked behind Fanny in the busy market, lugging the heavy baskets—or pumped water into the dishpan, or scrubbed the kitchen floor, her bony fingers clutching the scrub brush like lobster claws. Fanny knew who would be scouring the floors if Charles could not afford a maid.

The smell of cooking mutton finally crept upward to



"Half-past twelve! Hearing the cry of the milk vendor, Fanny sent Rosey rushing out into the street."

the parlor floor, and Fanny went back to her books. Instead of searching for the pudding recipe, she turned to the *Ladies' Companion*, which held a horrible fascination for her—all those lists of illnesses, diseases! She had taken for granted the doctoring her mother did at home, but now, it dawned on her, the good health of the household was in her hands. She skipped over teething ("lance the gums of the child"), "diarrhoea" (arrowroot gruel with a teaspoon of chalk) and rickets ("apply warm fomentations to the belly"). She wondered what "female obstructions" might be and whether she would ever suffer from them. She turned to consumption, and quickly prayed that no one she knew would get it. Lime water, sumac tea or a potion of hops, molasses and gin were remedies recommended. But Fanny knew nothing could cure it.

Moving on to coughs, heart palpitations and putrid sore throat, she had hope. Those she might master. But smallpox? Asiatic cholera? The first time she had read the book, Fanny had begun to cry and had to set the volume on the tea table. Here in New York, she thought, she and her family would be exempt from at least some of the disasters enumerated, for example, drowning. "There have been many extraordinary recoveries where the body has lain for hours under water," the manual sagely advised. "Let no violence of any kind, such as rolling on a barrel, be permitted." Indeed, she would not, should the time come. Well, on this sweltering morning she had no teething children, no consumptives and no drowned bodies. Fanny hitched her skirts above her knees to get some air. The parlor, with its velvet curtains, was a hotbox.

There were other sources of anxiety in housekeeping, even for the hale. Fanny knew that cleaning was no lark, but the directions for cleaning carpets, for example, sounded like a week's work. At home they had had bare floors and rag rugs but Charles had

bought wool carpets and he already worried about moths. "Take up and shake at least twice a year . . . put straw under. . . . Sprinkle tobacco or ground pepper on the floor. . . . Rub on, with a new broom, pared and grated raw potatoes." How long would it take to grate enough potatoes, let alone clean the rug?

And the etiquette—would she ever learn city manners? She did not mind being told, though she already knew it, that it was better to "wear coarse clothes with a clean skin than silk stockings drawn over dirty feet." But the dinner-party manners were stifling. "When the ladies leave the table, which they do together, at the signal of the mistress of the house, the gentlemen rise and conduct them to the door of the apartment, and then return to the table." What did the ladies do next, she wondered. Sit in the next room and wait for the men to drink their port? And society had now deemed it inelegant to eat with a knife, though Papa did, and so did Uncle Henry, in spite of Charles' having replaced the old-fashioned two-tined forks with new three-tined ones. "Can't make the peas set down on 'em!" Uncle Henry had bellowed.

But this was no time to be thinking of carpets and knives. The clock was striking half past nine. What she needed now was Mrs. Chadwick. Puddings. Every dinner must have its pudding. Men loved them so, and Mrs. C. supplied a magnificent procession of them, 88 in all. Suet and plum puddings, Royal Nursery Pudding, boiled puddings and baked puddings, sweet puddings and savory. Fanny read the recipe for Charleston Pudding: six eggs and half a pound each of raisins and currants. Fanny had no raisins. In any case, the Charleston Pudding must boil four hours. She must find a two- or three-hour pudding. Here was a recipe for Marlborough Pudding, her Papa's favorite:

"Stew and strain twenty-four apples; add while hot one and a half pounds of butter, one and a half pounds of sugar; when cool add twenty-four eggs, the juice of four lemons and peel grated, two nutmegs, two or four milk biscuits. Rosewater and salt to taste."

Twenty-four eggs would deplete the week's supply, and anyhow, where could you find apples in the month of July? Besides, Mrs. Chadwick had neglected to state how long the pudding must bake, as though any right-thinking Christian would know already. Fanny turned to the page with Indian Pudding, which wouldn't do, as it "must be made the night before." Boiled Flour Pudding it would have to be—milk, eggs, flour and salt. Only an hour and a half to cook. It sounded uninteresting, but she'd make a sauce for it.

And so she descended the kitchen stairs once more, reluctant to face the wood stove, though she prayed it was red-hot as Rosey had promised. She had begun to sweat under her whalebone stays, her two petticoats and her muslin dress. Though she weighed only 100 pounds, she encased her thorax each morning in the proper corset of a matron, lacing until she gasped. Charles liked to encircle her waist with his hands, and Fanny was very vain of her figure. Now, as the heat of the kitchen hit her in the face, she had to grab hold of the stair rail. Poor Rosey had to stoke the fire, summer and winter, and split the kindling, but at least she was not obliged to wear a corset.

By the time the pudding was set to boil, securely tied in the pudding bag but with room to swell, the clock was striking 11. Rosey had not been able to manage the icebox pan alone, and had spilled the water all over the kitchen floor, and Fanny had to clean the interior of the box herself, swabbing out the drainpipe with a long stick. As they struggled, the fire almost died again. Quickly they got it going once more, and the heat in the kitchen grew so powerful that Fanny, heedless of the flies, opened all the windows.

"Yes, Mum, but what about the iceman?"

"I can't endure it," she cried in the middle of the chocolate cream (she was boiling the quart of milk just prior to adding the gelatin, and had set Rosey to grating the French chocolate, which the poor girl had never seen before). She stripped out of her dress, down to her corset cover and petticoat. "Rosey," she said, "you must warn me if you hear them coming. Mr. Van would be very angry if he caught me in this state."

"Yes, Mum," Rosey replied, "but what about the iceman? He's due in the forenoon, ain't he?"

"Not until after dinner," asserted Fanny, by now stirring her chocolate-cream mixture in a pitcher over boiling water, which would require half an hour's time. The noon chime had sounded before she poured the dessert into its individual molds, whereupon she and Rosey began putting the fish cakes together and

readying the chops for frying, skimming the soup, slicing the bread and fetching the butter from the cellar. It had turned rancid in the heat.

Half-past twelve. Hearing the cry of the milk vendor, Fanny sent Rosey rushing into the street. Perhaps he would have a piece of butter she could put on the table. The table! She hadn't laid the table. She ran up the stairs to the dining room and hastily assembled the dinner plates, soup plates, knives, forks and spoons. Clutching the empty soup tureen under one arm, she descended the kitchen stairs, wondering whether she or the stair treads would wear out first.

She flew around the kitchen in a frenzy. Rosey arrived with the butter and carried it upstairs with the bread. Fanny turned the fish cakes, retrieved the pudding from its caldron (it had a suspiciously liquid look inside its bag), noted that the chocolate cream had not set, and burned her finger on the soup-kettle lid. Tears of real anguish, quite unlike the sentimental tears in *Godey's Lady's Book*, ran down her cheeks. Then she remembered that she had forgotten to make coffee.

At that very moment, four events transpired. The clock struck one, a rapping at the back door announced the iceman, Rosey screamed and the Van Courtlandt men came down the kitchen stairs—Uncle Henry first. Snatching her discarded clothing to her bosom, Fanny took refuge behind a ladder-back chair. To the end of her days she remembered the five faces: the iceman astounded, Uncle Henry horrified, Charles chalk white, Cousin Samuel a little too amused for his own good and Rosey dabbing her eyes with her soup-stained apron. Fanny had forgotten to tell her to change.

"To the end of her days Fanny remembered the five faces: the iceman astounded, Uncle Henry horrified, Charles chalk white, Cousin Samuel a little too amused for his own good, Rosey dabbing her eyes."

By John Dornberg

Dutch engineers steal a march on the greedy sea

After centuries of struggle with its perennial enemy, the Netherlands is trying to gain an edge by building a gigantic storm-surge barrier

From a distance, as they rise out of the water, they resemble skyscrapers or modernistic cathedrals. The sight is as awesome as it is perplexing: 65 huge pillars, up to 12 stories high. For what purpose?

Like the windmills of yesteryear and the legend of the stalwart young boy who saved the country by sticking his finger into a hole in the dike, these odd-looking edifices near the Dutch town of Zierikzee symbolize the centuries-old struggle by the people of the Netherlands against their perennial enemy, the sea. The pillars are part of a gigantic new defense.

The struggle has been a heroic albeit Sisyphean one in which the forces of nature have thwarted human ingenuity and courage. Since the year 1200 the Dutch have reclaimed more than 2,600 square miles of land from the ocean by building dikes around areas left dry at low tide or by draining pools and marshes with windmills and, in more recent times, with steam, diesel and electric pumps. Yet during that same period almost as much land—2,150 square miles—has been lost.

Today, more than 1,800 miles of ocean dams and inland dikes protect the country. Without them nearly

two-thirds of Holland would be inundated twice daily by the tides. Despite all those barriers, catastrophe strikes with persistent regularity, especially in the densely populated southwestern provinces where almost every generation has experienced disastrous floods.

Now, as a result of the most recent deluge, they are erecting what will be the world's most colossal coastal-protection and technologically daring water-management system: a huge storm-surge barrier across the mouth of the Oosterschelde, the Eastern Scheldt. Five times larger and vastly more complicated than the Thames Barrier protecting London (SMITHSONIAN, August 1982), it was begun in 1978 and is to be completed in 1986. By then this engineering masterpiece will have cost Dutch taxpayers nearly $3 billion.

The catastrophe that instigated it was a monster storm. Nothing in Dutch memory or history compares with the night of February 1, 1953, when Atlantic and North Sea tidal waves engulfed the estuarial delta of the Rhine, Maas and Scheldt rivers, crushed dikes and locks, endangered the whole economic heart of the Netherlands, and inundated the entire region south of Rotterdam. Despite the efforts of a whole army of flood workers, more than 1,800 people drowned, some 50,000 houses were washed away, and 70,000 people had to be evacuated from homes threatened by collapse. Material damage exceeded $500 million.

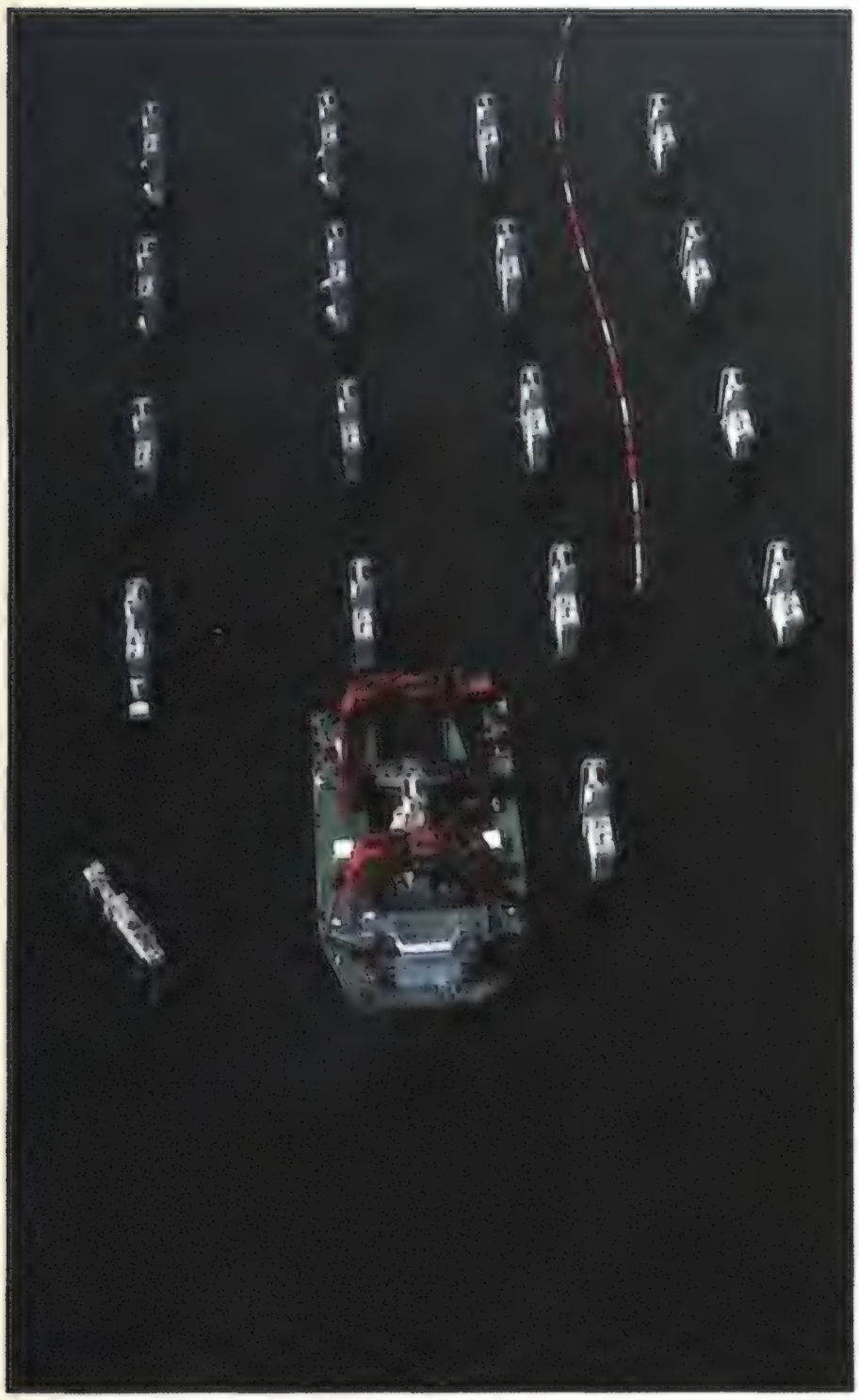
As had happened after other floods, a Royal Commission was formed to draft a program that would protect Holland "once and for all" from such calamities. Its "Delta Plan," approved by the parliament in 1958, called for building dams across most of the tidal estuaries and inlets of Zeeland and Brabant.

The dams, while also straightening and shortening the country's coastline by 435 miles, were to form an impregnable first line of defense behind which would be a network of inland lakes and seas, some with tideless fresh water, others with semi-stagnant salt water. They were to be linked to each other by sophisticated locks to accommodate the vast flow of coastal and river shipping: almost half a billion tons of freight annually and as many as 1,000 barges daily.

The Dutch being a methodical people, they began by damming up the smallest of the estuaries. Then

Massive, nearly completed pillars stand in one of three construction docks. When they are finished, the dock will be flooded and the pillars taken to their final positions by a specially designed ship.

Stealing a march on the sea



At a flooded construction dock, the *Ostrea*, a special lifting vessel, pulls pillar straight up out of water.

engineers of the Rijkswaterstaat, the Department of Public Works, moved on to tackle the larger and more ambitious projects outlined in the plan. By 1972 three of the major openings had been closed and work had started on the fourth and widest—the Oosterschelde.

By then environmentalists and oyster farmers were up in arms (SMITHSONIAN, September 1972). The Oosterschelde is famed for its variety and abundance of flora, fauna and marine life. If the estuary were to be completely dammed off, turning it into a brackish, stagnant lake, the ecologists argued, all this unique life would be snuffed out. Even stronger objections came from the oystermen who do about $13 million worth of business from the Oosterschelde beds.

Parliament ordered a compromise: construction of a storm-surge barrier that will normally remain open, thus preserving the ecological balance and tidal movement, but which can be closed, like a vast lock, with as little as an hour's notice when seas threaten.

Grand as the project is, it is also controversial. "Opposition to the original dam proposal started with a minority but won the support of a majority," sighed B. W. de Waal-Malefijt of the Rijkswaterstaat, my host when I toured the construction site near Zierikzee, a pristine medieval town. The new solution is much more ambitious—and much more expensive. "So here we are with this engineering paradise, doing things that have never been done before and that many experts said could not even be done. But, unfortunately, it is also costing about three times as much as a conventional dam."

Even so, Dutch taxpayers are already getting their money's worth. The project has provided some 7,000 jobs over the past three years—a substantial boost to a country of 14 million with a persistent 10 percent unemployment rate. It has focused world attention on Dutch know-how, and has become a tourist attraction.

A mind-boggling, modern version of the pyramids

A visit is a memorable experience. What I saw is technologically mind-boggling: a modern version of the pyramids but with specifications so exact and tolerances so narrow—one-hundredth of one percent—that even NASA turned down a Dutch request for help on preliminary computations.

The barrier, reaching from shore to shore in three segments between two artificial islands, will be more than two miles long and consist of 62 steel gates, or curtains, each measuring as much as 138 feet wide, 18 feet thick, 39 feet high and weighing nearly 500 tons. They will hang between those 65 gigantic concrete pillars, each weighing almost 18,000 tons.

Virtual colossi, these pillars were constructed in cofferdam drydocks on the larger of the two islands

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Artist's version shows how completed storm-surge barrier will appear at the mouth of the Netherlands' Oosterschelde. Sixty-five pillars joining 62 steel gates span two miles, crossing two artificial islands.

and are being moved into place by a hoisting ship, the *Ostrea* (Oyster), designed specifically for the task.

Each of the hydraulically operated gates will function independently and can be raised or lowered—completely or partially—depending on weather conditions. A four-lane highway between the two shores will cap the barrier when it is completed.

Straightforward as all that sounds, the engineering obstacles, technological hurdles and hydrostatic peculiarities posed immense problems. Solving them has given rise to numerous high-tech innovations since work began in 1978.

Each gate must function with precision smoothness, yet be strong enough to withstand gale and wave forces that reach seven tons of pressure per square yard. To prevent the buildup of underwater pressure in the channel, where the current speed is nine miles per hour, the foundations of the pillars and sill beams had to be designed like a gigantic filter.

To prevent future erosion and shifting of the sea floor, 45 million square feet of it were covered with a flexible "carpet" of mats covered with concrete blocks. The 750 mats were laid out so precisely that there is less than an inch between them. To make sure the mats fitted that closely, the Dutch technicians wanted visual inspection of the estuary's floor. But the channel is so turbulent and dark, with constantly swirling sand, that divers were unable to see and only got a fog effect when using lights.

Undaunted, Rijkswaterstaat technicians designed and built their own device: a submersible, remote-controlled caterpillar with high-resolution TV cameras that can pick out the smallest objects on the seabed in nearly total darkness and sensors that can probe to more than 12 feet below the estuary floor.

With the seabed thus sealed and presumably in place for ages to come, the next task was to provide a proper foundation for the 65 pillars. "People say we must be crazy for building cathedrals on sand," said Malefijt. "The thing is, we're not really building them on sand. We're putting them on mattresses."

The "mattresses"—the proper term for one of them is "filter mat"—mark another technological breakthrough. Assembled in a special plant on one of the islands, each of them weighs 5,600 tons, is 14 inches thick and is filled with sand and gravel. One pillar rests on two such mats and is held in place by an artificial sill of stones, rocks and boulders in varying, graded weights and sizes, the biggest ones on top. With virtually no rocks of its own, Holland is importing all

The author, a free-lance writer who now lives in Munich, is a former Newsweek *bureau chief in Moscow and Vienna, and has been a correspondent in Bonn.*

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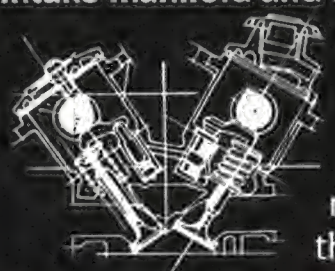

Revel in the raw power of the fastest Supra ever.

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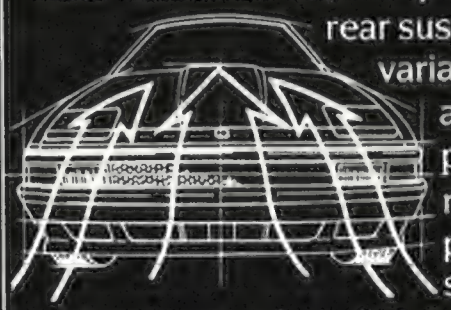

225/60HR14 wide radial tires on 14" x 7" aluminum alloy wheels, and a front air dam to channel the wind give Supra precision to conquer the curves, tame the turns and chew up the straightaways.

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five million tons of them from countries as far distant as Sweden and Finland. Besides giving the pillars a solid foundation and holding them in place, the mats and sills allow water to flow freely around them.

Placing the unwieldy sand-and-gravel mats on the seafloor, with a maximum deviation of less than one inch from their designated location, required building yet another special ship, the *Cardium* (Cockle), whose operation is computer-controlled. Even greater precision is required of the *Ostrea,* which lifts the prefabricated, 12-story, 18,000-ton pillars from their flooded cofferdam construction areas and moves them out to their "mattress" locations at the mouth of the estuary. "The installation of each pillar requires almost as much planning and electronic guidance as a space-shuttle launch," said Malefijt as he led me, rather breathless, up five decks to the bridge of the *Ostrea.*

While that sounds like a bit of Dutch hyperbole, the bridge does awesomely resemble a launch center. Besides three separate computer banks to control the ship's winches, engines and movements, and an array of terminal screens, the *Ostrea* also has a black-box guidance system with laser-beam and infrared gadgetry to determine the pillar's angle and alignment, and the water current and wind speed. The system is so refined and reliable that each of the 16 pillars emplaced by the end of 1983 was within several centimeters of its predetermined position.

The barrier is not the only construction project in and around the Oosterschelde, however, for despite its ingeniousness, it will still affect the environmental balance there. It will increase the speed of the current at the mouth of the estuary and reduce the water supply and tidal action farther inward. Some water will become clearer, but in other spots silt deposits are expected to rise.

To reduce these effects, the entire estuary is being artificially compartmentalized into tidal-salt, stagnant-salt and freshwater areas by means of two large dams, one near the village of St. Philipsland, the other about 25 miles from the storm-surge barrier, near the city of Bergen-op-Zoom. Those dams require locks through which the millions of tons of barge traffic between Rotterdam and south Holland can pass. Conventional locks, however, would negate the compartmentalization and cause intrusion of salt water into fresh, or fresh water into the Oosterschelde's tidal basin. To prevent that, a unique system that separates salt water from fresh was built into the locks.

Despite all the innovative solutions, advanced technology and efforts to protect both the environment and Holland from another deluge, the barrier remains controversial. Typical of the Dutch people's attitudes were those reported in an *International Herald Tribune* article last year. "This barrier is only a compromise," said Ben Jensen, an editor of the *Provinciale Zeeuwse Courant,* a regional daily. He pointed out that many of the local fishermen, oyster farmers and environmentalists, fearing that the barrier would reduce tidal movement, were "still not quite happy."

Some thrifty Dutch also view the project as a waste of money. In Zierikzee and Bergen-op-Zoom one hears the argument that storms as severe as that in 1953 are likely to occur only once in two centuries, and that dikes in place then were strong and high enough to

Filter mat (left) aboard the *Cardium* will be unrolled and laid on ocean floor to prevent future erosion.

protect against tidal waves that have a statistical probability of occurring only once in 80 years. "What is the point," asked one ruddy café customer in Zierikzee, "of spending all this money as a hedge against something that might happen in the year 2100?"

"Because it could also happen again tomorrow," replied a project spokesman.

Another knotty question: What will happen to all the expensive, sophisticated equipment in use and who will benefit from the know-how gained on the project? "The filter-mat technology," Malefijt explained, "is almost tailor-made for building desert airstrips, and some Arab countries are already interested. We are talking to the Canadians about leasing or selling some of the special ships for construction of a big hydroelectric plant in the Bay of Fundy. The Italians are showing an interest in the barrier design—as perhaps the only means to save Venice."

From its inception the project has repeatedly entailed breaching what were thought to be technical and engineering limits. As a result, Dutch government technicians and their know-how are already on loan to other countries: South Korea, Canada, Colombia, Trinidad and Tobago, and the United States.

The huge "curtain" may seem a far cry from the dikes the Dutch began building eight and more centuries ago, and from the 10,000 windmills once in operation to drain the polders. But the principle behind it is the same: reclaiming land, fighting off the sea and keeping Holland dry.

By Charles Bergman

The mountain goat foments trouble in a fragile paradise

In Olympic National Park these magnificent animals are like 'Rototillers in heaven,' but experts are seeking a humane solution

A big billy, white-bearded and suspicious, ambled onto the ridge below Mt. Angeles. He paused at the edge of the 40-by-40-foot net suspended on poles like a tent for a religious revival. Barely 20 feet away, he looked at us, sniffed the misty air and licked the nylon net with a thick black tongue.

"Now?"

"No. Wait till he gets to the center."

But he drifted out from under the net and into the subalpine fir forest. In a moment he made another pass under the edges of the net. Attracted to the buckets of salt in the center, he barely reached them on the third pass when a voice called out "Now!"

Two men jerked the pull ropes. The net collapsed. Before it hit the goat, he had already made three leaps toward the outer edges. In the same few seconds, the crew of biologists and park rangers sprang onto the bounding goat. He was one of the biggest they had ever caught, about 250 pounds, and it took four men to wrestle him to the ground. One man slipped pieces of green garden hose over the goat's stiletto-sharp horns, another hobbled his hooves, and two more covered his bronze eyes with a blue-denim mask.

We caught the goat because he did not belong here. Mt. Angeles is in the Olympic Mountains, one of the many peaks in the 1,400-square-mile wilderness of Washington's Olympic National Park. The problem is that mountain goats are not native to this area. Nearly 100,000 goats inhabit craggy cliffs and alpine meadows throughout the Northwest, from Washington, Idaho and Montana northward into Alaska. But for interesting geological reasons, the Olympic Mountains, in the extreme northwestern corner of the contiguous United States, were one of the ranges without goats until a dozen were introduced about 60 years ago. Those few goats found the Olympics congenial, ideally suited to their needs, and their population exploded. Now, there are more than 1,000 goats in the park.

Inspired by the peaks scarfed with snow, an early explorer named the highest peak Mt. Olympus after the ancient Greek "Home of the Gods." But putting mountain goats here turned out to be like putting Rototillers in heaven. They are chewing up the plant life and digging up the meadows. Although the mountain goats seem to epitomize Olympic National Park,

Fence excludes goats from this plot so that botanists can study the effects of overgrazing (foreground).

Craggy cliffs are home to this nanny, whose winter coat is beginning to show effects of spring shedding.

Photographs by Art Wolfe

they are nevertheless "exotics" and they have upset the delicate ecological balance of the wilderness system.

In an attempt to solve the goat problem, park biologists have developed a four-year experimental management project that includes capturing wild goats under drop nets and transferring them, in boxes dangling by cables from a helicopter, out of the park. Even more remarkable and innovative, they are experimenting with two kinds of birth control: hormone implants for some nannies to inhibit estrus and in-the-field surgical sterilization for others.

Bruce Moorhead, wildlife management biologist for Olympic National Park, was the early prophet of the problems caused by the goats. He calls the proliferation of exotic species "one of the most significant wildlife dilemmas in the world." The problem is especially intense for our National Park Service. It is required by its charter to preserve its lands in their original and natural state as refuges for future generations of both people and native wildlife. The irony here is that our national parks, as well as other wild areas, are being increasingly violated not only by human activities but also by animals. "In Great Smoky Mountains National Park," said Moorhead, "they have the introduced Russian boar, and the Grand Canyon National Park had feral burros. We have goats."

One notable attempt to control a population explosion of introduced animals involved the Grand Canyon burros. Released by prospectors around the turn of the century, the burros adapted easily, trampling the canyon and competing with the native bighorn sheep for forage. Between 1924 and 1969, the park tried to eliminate the burros, shooting or removing nearly 3,000. The effort was never successful and so controversial that it ended up in court. The problem was finally resolved when the burros were removed by an animal-rescue organization at a cost of $500,000.

Decoys failed to attract goats, but salt buckets placed under drop net at top appear to be winners.

"We just couldn't jump into an adverse program," said Don Jackson, Assistant Superintendent of Olympic National Park. "You have to understand, we don't exactly have a population problem. *One* goat in the Olympics would be an overpopulation. One of our options is to eliminate the goats completely, like shooting them. But we decided to develop more humane options. We were convinced something needed to be done to protect the whole park—and pronto!"

"The project began modestly in 1971," said Moorhead, "when the chief ranger told me, 'I think those mountain goats need looking into.' Very little was known about them because they live in such inaccessible areas. So we began studies."

They observed that mountain goats are not exactly sociable animals—they keep their distance and are often aggressive, circling and hooking each other. Among themselves, goats are rough and use their horns like knife fighters. While dust bathing, feeding or resting, the goats will often lower their heads and stab at each other. The jabbing and head tossing are so common that mountain goats have developed a thickening of the skin, called a dermal shield, in the groin and rear, for protection from sharp horns. Most adults have scars. Nevertheless, they hang out on the ridges in

Climber uses ice ax to shoo visitors out of fire pit at campsite that is popular with both goats and people.

Charles Bergman, an avid backpacker, is an Associate Professor of English at Pacific Lutheran University.

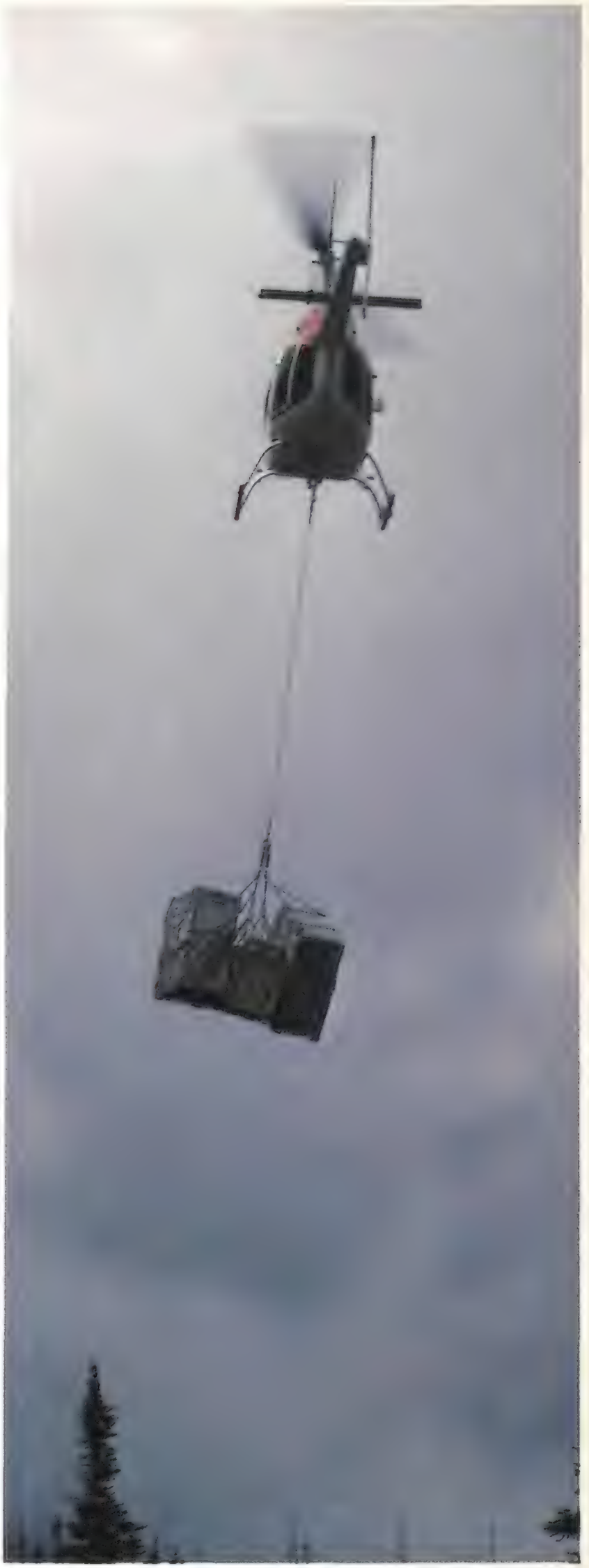
Adult billy has just been trapped under a drop net, and biologists move quickly to prevent injury.

small groups or "nodes" of from three to 30 goats.

Although mountain goats seem to move effortlessly across the sheer cliffs and rocky ledges, where they are so at home, heights have their dangers even for them. The goats are not always as sure-footed as is commonly supposed and they sometimes fall to their death. In the Olympics most injuries to adults probably happen in winter on the icy cliffs. No biologists have witnessed a fall but they have found carcasses.

The goats are not native to these mountains because the Olympics are a biological island surrounded on three sides by a moat of salt water. Their isolation makes them unique for the wildlife that they do not have. Although the park is one of the best places to go in the Pacific Northwest to see bear or elk or deer, several species of animals that are common to other mountains nearby are conspicuously absent here. "We've never had grizzly bears or wolverines," Don Jackson said. The alpine areas evolved without herbivores like bighorn sheep or the pika, a rock rabbit. The plants and animals that did make it to the peninsula evolved on their alpine island in distinctive ways. The Olympic marmot, for example, is a different species from the marmots found only 80 air miles away, in the Cascade Mountains. Among the delicate alpine plants, which cover the summer meadows in a brilliant brocade, 12 are endemic to the Olympics.

The exotic goats now exist throughout the park and their craving for salt has led to frequent encounters with people. "The goats get this 'Big Mac attack' for salt," said Moorhead, laughing, "and they have come to associate salt with humans." They get salt from human



Helicopter airlifts goats in crates down Klahhane Ridge to waiting trucks for nonstop trip to new home.

urine, which is for them a kind of Olympian nectar. "They'll come on the trot when people are urinating."

They also get salt from human sweat. On a hike in the Olympics on a warm sunny day, some friends and I worked up a drenching sweat climbing uphill through the forests of huge conifers. When we reached the tree line, we took off our shirts as we pitched camp. Several goats came and started licking and chewing our clothes, including my T-shirt, for the salt.

So far, no one has been seriously hurt by the goats, yet they can be disconcerting and are potentially dangerous. When several of us went backpacking into Royal Basin, we decided to camp under the dry overhang of a large rock. I awoke in the middle of the night to heavy breathing and a muzzle in my face. Thinking "Bears!" and too terrified to utter a sound, I slowly realized I was nose-to-nose with a nanny. Twenty mountain goats had invaded our campsite. Yet they seemed so tame that we simply went back to sleep.

The next day, all of us—goats and hikers—were still under the rock. For some reason, the goats particularly liked to stand in the fire pit (p. 104). We couldn't shoo them away. We finally had to tap them on the horns with our ice axes to get them to move. According to Moorhead, "Some backpackers are hassled and scared when the goats hook with their horns like Spanish fighting bulls. They tilt their horns at you, but they're often only feinting. What they're after is your urine."

As they dig into the meadows with their hooves and snouts, the goats destroy alpine plants in the park, but there are many other ways they can do damage. They tread with a heavy foot, trampling the delicate wildflower meadows and digging deep wallows in the dirt where they rest. During mating season in the fall, the billies paw rutting pits as part of their courtship ritual. Finally, slowly working their way along—what one biologist called "snuffling"—the goats graze the

The approach of humans on the ridge above him has caused this young billy to raise his tail in alarm.

plants of the meadows and slopes. In goat habitat areas, some endemic plants have become harder to find.

When I accompanied a group of plant biologists we ran into dramatic evidence of the goats' impact. Wallows ran down one slope like long gashes in the loose soil, one after another, some up to 30 feet long. "The meadows are very sensitive," Ed Schreiner, plant ecologist for the park, told me. "They have only short summers for growing and the soil layer is thin. So they recover slowly. I trampled a small piece of meadow as part of an experiment to measure recovery rates. In this dry area, the phlox would take over two centuries to recover. This was also goat habitat."

His summer coat is short and dense, but it will grow longer and shaggier as winter months approach.

The only hope for protecting the park is controlling the goat population. So far 155 goats have been caught and deported. The captures tend to take place in pulses during warm weather, but the sun can be a rare commodity in the Olympics, particularly in June when the capture operation begins. Blowing in from the Pacific Ocean, the clouds hit the 7,000-foot peaks that rise only 25 miles inland from the coastline. The result is up to 200 inches of rain on the west slope—the wettest place in the contiguous United States.

While Moorhead would rather run the capture during August, when the weather is usually better, he chose June because the goats' craving for salt is greatest between the snow season and summer. "The transition from scruffy winter feed to the lush vegetation is hard for them and they lose sodium," he said. "They replace it directly with salt. They have a peak interest for a couple of weeks and we have to be there."

When the goat crew is in full swing, the capture net can be busy. For two to three weeks, Klahhane Ridge is crowded with plant and wildlife biologists, park rangers, university faculty, veterinarians, game department officials, helicopter pilots and volunteers—25 people on a given day is not uncommon. When several goats wandered under the drop net at once, the scene resembled a scrimmage with the players tackling the

goats. Once the goats were on the ground, the biologists began the "medical protocol."

Under the stress of handling, the goats can develop what is called "capture myopathy." Two of the first goats captured in 1976 died of the syndrome, which results from emotional stress, extreme physical exertion and increased body temperature. The trauma of handling causes such muscle exhaustion and lactic acid buildup that fatal muscle degeneration (myopathy) and paralysis occur. To reduce the trauma biologists must minimize the time they spend handling the goats. Big capsules of sodium bicarbonate are forced down their throats to counter the lactic acid. Shots of Valium are given to relax muscles, and penicillin to counter infection and pneumonia. In addition to weighing, measuring and collaring the animals, biologists also read goats' ages. Since their horns grow in summer and are dormant in winter, the animal wears its age etched in growth rings.

Once the goats are processed, they are kenneled in individual crates and flown off Klahhane Ridge suspended from a helicopter (p. 105). Trucks and boats then carry them to a new area outside the park. The crate is carpeted with snow to keep the goat from overheating. Like other ruminants, goats have hitchhiking microorganisms in their stomachs to help them digest their tough forage. These microorganisms, however, create a sort of furnace in the goat's stomach, which is one of the ways the goat stays warm through an alpine winter and one of the reasons it rests on snow patches to cool off in the summer. But the heating also contributes to capture myopathy.

Goats return to native habitats

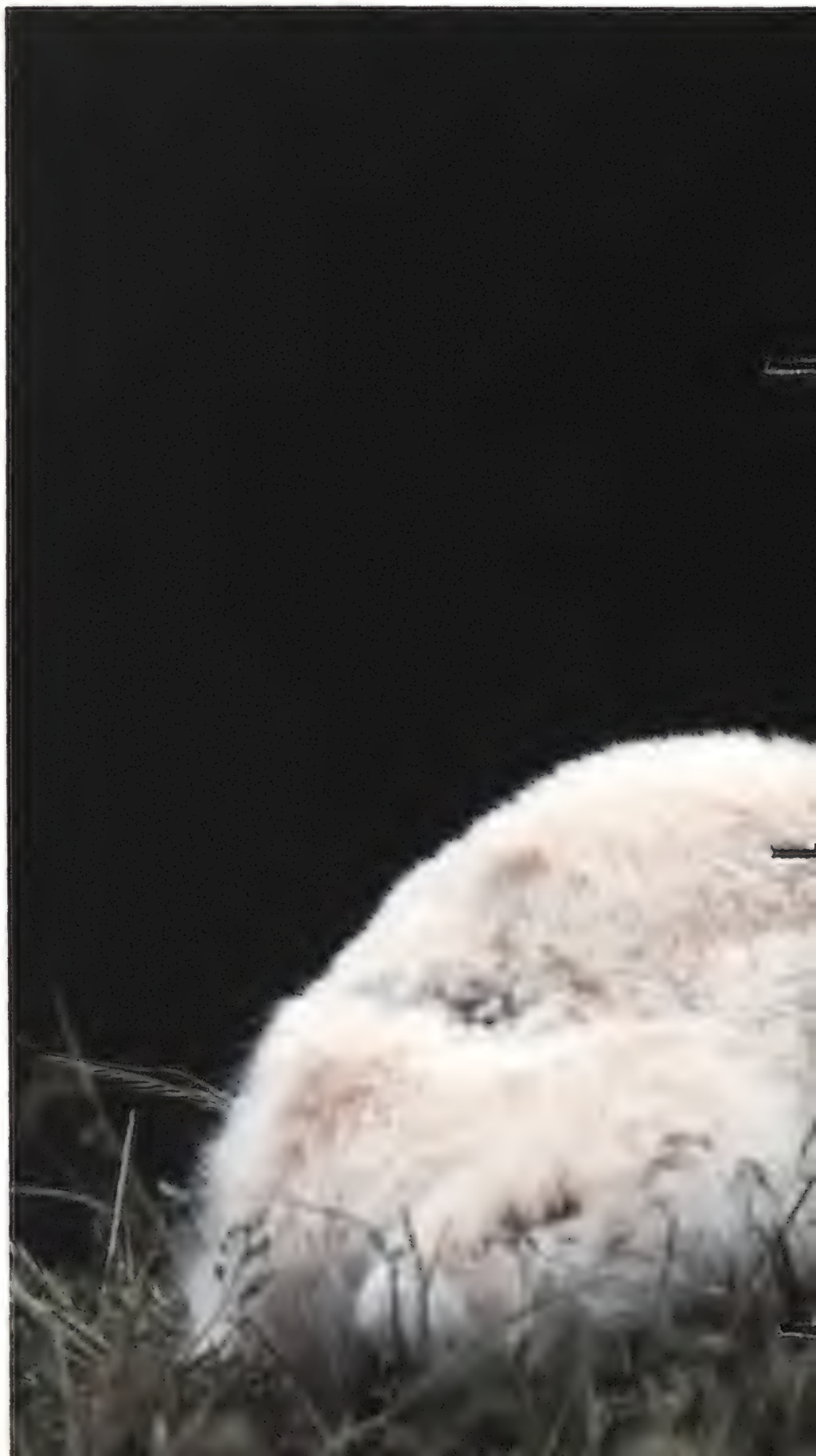
The goats that I helped capture were released from their crates near Lake Chelan, on the eastern side of the Cascade Mountains in Washington. In past years other goats wound up in Idaho, Nevada and Utah. Olympic National Park tries to ship the goats to native habitats where they were once plentiful but have for various reasons declined. "We don't want to export our problems," explained Don Jackson.

There is so much concern about the goat population that Moorhead has also been experimenting with birth-control techniques. The head veterinarian in these surgical experiments is Dr. Jim Foster of Woodland Park Zoo in Seattle, who developed both the medical protocol and, along with Dr. Stephen Seager of the veterinary college at Texas A&M, birth-control techniques for the wild goats. Said Foster: "The plan is to implant ten nannies with hormones and to sterilize by tubal ligation about three more. Then we'll follow them over the next two or three years with radio collars to assess their reproductivity. We also want to see if there are any side effects on their social behavior."

The small implant is slipped under the skin of the goat's neck. It is synthetic progesterone in a silicone base, which inhibits estrus and is time-released over three years. Nannies usually breed for about six years. "The implant cuts her fertility in half," said Foster.

So far, only ten females and one male have been sterilized. Last year, for the first time, we caught a male, collected semen and performed a vasectomy. Near the navel, Seager cut a small incision, through which he inserted a fiber-optic tube. Through a nearby second incision, they slipped the cauterizing instrument.

Affectionate and playful, these month-old kids will be weaned and eating grass in a few more weeks.



The females have been given a tubal ligation through a similar operation.

Foster is optimistic about both the implants and the sterilization. "We found two of the three nannies with implants in 1982," he said, "and they did not have kids. Personally, I think these techniques are going to be quite feasible."

Moorhead is not sure which of their experimental programs will work on a large scale. Effective sterilization requires capture of a sufficient number of goats. Recent test captures in the remote interior of the park indicate that most of the goat population is not tamely drawn to salt. Where goats can be obtained, the cost of capturing and transferring each one is about $1,500. According to Moorhead, "We don't want to be forced to destroy them, but we have to take more active measures. The public has always been behind us in supporting more humane methods and we will be having public hearings next year. We still don't know what our final recommendations will be, but time is running out." It is hoped that the sterilization and birth-control implant programs will work out. If not, then it may be time for these creatures to leave their Olympian range and thrive in a wilderness where they are native.

A nanny typically has a single kid, which will stay with her for a full year before going on its own.

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By Stephen S. Hall

Eureka! Inventors, and how they get their wheels turning

First comes perspiration, then inspiration and then, all too often, a long bout with litigation

Turntable in sketch of his popular straight-line phonograph arm frames Jacob Rabinow, a longtime independent inventor who holds more than 200 U.S. patents.

On a hot summer day in the early 1950s, young Curtis Landi discovered a hole in the fence that surrounded an imposing industrial complex in West Orange, New Jersey, not far from his home. So he promptly crawled through the opening, wandered around, and snuck into an abandoned building. He recalls finding an old-fashioned desk and a bunch of pencils flattened by teeth marks. He also recalls being discovered by a guard who found him gnawing on one of the pencils. "You shouldn't put those things in your mouth," the guard warned. "Mr. Edison used to chew on those pencils—you don't know what germs are on those things."

The story may be apocryphal, but the "germs" evidently are real. Thomas Alva Edison obtained 1,093 patents, many of them based on ideas that he developed at the West Orange laboratory. Last winter, 37-year-old Curt Landi received his first patent. It was granted for a method that he devised using a flexible honeycomb-structured material in protective sports gear. Same germ, same disease. Inventing.

The symptoms haven't changed much over the years: energy and perseverance; a room-size ego; self-belief bordering on evangelism; justifiable paranoia masquerading as caution; stubbornness and loneliness; a rare and vital gift for visualizing things that did not exist before; a desire to make the world a better place; and, by the by, the desire to make a nice chunk of change. "It's a disease," confirms New England inventor Walter Nold, who gave the world the Seismitron, an instrument that is used to predict tunnel cave-ins and landslides. Like love, however, inventing is an affliction for which its victims desire no cure.

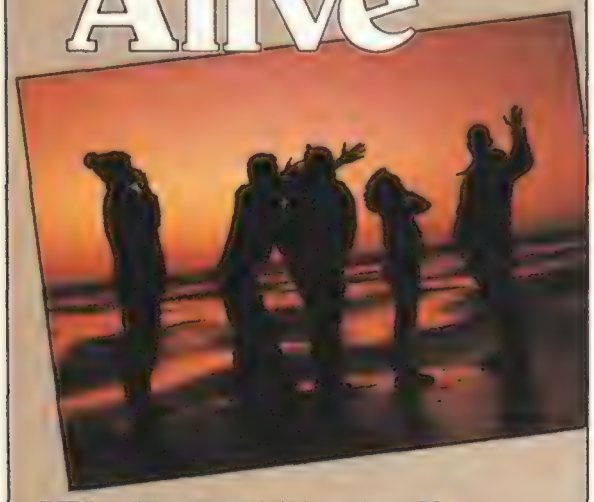
Why do inventors invent? Mark Twain, who is credited with devising suspenders, offered as good an explanation as any. "To give birth to an idea—to discover a great thought—an intellectual nugget, right under the dust of a field that many a brain-plow had gone over before," he wrote in *The Innocents Abroad.* "To find a new planet, to invent a new hinge, to find the way to make the lightnings carry your messages. To be the *first*—that is the idea."

People at the U.S. Department of Commerce's Patent and Trademark Office, which keeps track of who is first, sometimes refer to Twain and Landi and the thousands of other lone wolves who don't work for corporations or academic institutions as "attic" inventors. Independent inventors don't care much for the term; Landi says it reminds some people of "guys who are flaky and write things down on napkins." Call them what you will, they account for about one out of every four patents issued.

It is difficult to go through an average day without using at least one

Photographs by Joe McNally

35mm That Comes Alive



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Curt Landi, who lived near one of Thomas Edison's old labs as a boy, got his first patent for method of using honeycomb material in sports gear.

product that sprang from the mind of an independent inventor. For your morning shave, you might use a successor to King Gillette's first safety razor. To copy a document at the office, you probably employ a process developed by inventor Charles Carlson—xerography. Filling up the fuel tank of your car, you can thank an independent inventor named Eugene Houdry, who devised an efficient method of "cracking" petroleum to get gasoline. If you take an instant picture when you get home at night, you are using a process that was patented by inventor Edwin Land. Throw in the zipper, invented in 1892 by Witcomb Judson, and it's clear that we would indeed be in trouble without these enterprising people.

Notwithstanding their impressive accomplishments, however, it has become almost commonplace these days to lament the demise of attic inventors. The elegies can come from within the fraternity. Narinder S. Kapany of Palo Alto, California, who is sometimes called "the father of fiber optics," maintains: "The days of the lone inventor in the lab are, unfortunately, truly over." Or they can come from the outside, as when a Commerce Department official says, "If you're talking about the guy working in his garage on gadgets, you're talking about zillion-to-one odds of getting anything into the marketplace."

The practitioners themselves seem to like the odds, and that says a lot about their mentality, not to mention their bullheadedness. No faith is stronger than that of an independent inventor who thinks he has a good idea. Whether he works in an attic, a basement, a garage or a workshop, each inventor believes he possesses a unique creative vision. Often that vision blurs into self-delusion. Still, the true believer plugs on.

The author wrote about boomerangs in the June issue of SMITHSONIAN.

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The long and improbable road to riches usually begins with a patent, which rewards "any new and useful" idea—a process, a product or a material—with protection in the marketplace. This piece of paper, issued by the U.S. Patent and Trademark Office, gives an inventor exclusive rights to make, use and sell his invention for a period of 17 years. That doesn't mean it *will* be made and sold, however.

Many an inventor has assigned his rights to a manufacturer, never to see a penny in royalties. Others have retained their rights, only to go broke trying to bring their ideas to the marketplace. But all it takes are a few exceptions, a few who successfully buck the odds, to keep the others going. And as every inventor knows full well, not only did Gillette, Carlson and Land become wealthy as a result of their innovative concepts, they also sparked the development of entirely new fields of technology.

Most inventors love to talk about how the creative process works. New Yorker Jerome H. Lemelson "saw" robots in his mind back in the 1950s and received basic patents in the field simply by writing his ideas down on paper—no lab, no prototypes, just imagination. Gordon Gould, who did some of the early conceptual work on lasers, speaks of a cerebral "churning" that grows richer with the accumulated knowledge of a lifetime. To Jacob Rabinow, who in 1948 came up with a 20-inch flexible disk that could store a million bits of computer memory, inventing is not a logical process. "It's a random search for new combinations of old ideas," he says.

Kapany, an urbane and turbaned 55-year-old Sikh from Punjab, describes it as a kind of colossal jigsaw puzzle of the mind. "You carry an inventory of problems to solve, and an inventory of solutions to problems, in your head," he says, "and you sit down with a glass of wine and relax and begin to attack the problem." The pieces fall together in mysterious ways: Kapany attributes two of his more than a hundred patents to solutions that came to him in dreams.

Curt Landi, who works as a private patent investigator, got the idea for his sports-gear invention back in the mid-1960s, when he was examining animal and insect issues through a microscope. "I was observing the structure," he recalls, "and it just dawned on me that honeycomb was a phenomenal structure." What he has done, in fact, is use thin sheets of synthetic honeycomb as the shock-absorbing core between two layers of facing material. Landi plans to hit the market soon with a special athletic insole made of the material. But that's only a beginning. Eventually, he hopes to branch out into other arenas as well—everything from ballistic panels and building products to orthopedic devices and blowout-proof tires.

Double exposure shows Polish émigré Mark Raczkowski's self-making bed in action. Raczkowski has not found a manufacturer for his invention.

"You invent because something bothers you," says Jacob Rabinow of Bethesda, Maryland. With 218 U.S. patents, Rabinow apparently is in a productive tizzy much of the time. "Whenever something doesn't work, I do what everyone else does," he says. "I curse. Then I think. Then I start to work on it. The more things you play with and the more uninhibited you become, the more likely you are to find a solution."

Rabinow often dons his gray suit, loads up an old square-cornered, straw-colored suitcase, and motors down to the U.S. Patent Office in Arlington, Virginia, to lecture special visitors. He pulls strange and whimsical objects out of his case (a nutcracker made from a caulking gun, a book that unfolds into a footstool, venetian blinds made of a single length of twisted ribbon) and relates amusing tales of involuntary humility. Like the time he showed up at the Patent Office in 1938 with a revolutionary 3-D movie system. A bureaucrat yawned, opened a long file drawer, pulled out a file without looking, and asked, "Is this what you mean?" "It was exactly the same as mine," recalls Rabinow, "word for word. And it had been issued in 1910, the year I was born."

One of the biggest problems inventors face is that they are often too far ahead of their time. "It's a demeaning job to sell an invention, to knock on doors and go hat in hand to someone who in technical knowledge can't

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One of New Englander Walter Nold's latest inventions produces purified water that improves efficiency of instrument gauges and relieves stomach gas.

shine your shoes," grumbles Rabinow. But although many of Rabinow's inventions have been snubbed by potential manufacturers, the Smithsonian's National Museum of American History has already accessioned several of them, including a reading machine, a straight-line phonograph arm and a clock regulator. "Many large companies understand profit and loss," Jacob Rabinow says, "but they stink as technologists."

While it may be true that businessmen often fail to recognize good ideas, it is also true that inventors often fail to market their ideas effectively. But not Robert K. Vicino. He lives in California, where there may be more inventors per square mile than in any other state, and where you can see the future of invention. It's called marketing, and Vicino's spiffy Rolls-Royce and 1941 Stearman biplane are tangible evidence of his shrewd entrepreneurial skills. He is a pioneer in the use of "inflatables," or balloons, as an advertising medium. He is perhaps best known for his wind-whipped attempt to put an inflatable King Kong on the Empire State Building last year, but he has also used the balloon successfully in outdoor billboards and in the form of particular products—e.g., a giant tequila bottle.

The holder of seven patents, Vicino did not originate the idea of using inflatables for advertising, but he does claim to have perfected them for that purpose. "I took the hot air out of the balloon," he says, "put a fan in the bottom and repackaged and reshaped it."

Having got his balloon business off the ground, Vicino sold it this year (at 31 he is a multimillionaire) and is now pumping up a new company. It will market a method of using inflatable forms to build structures out of sprayed foam, plaster and concrete. Vicino likens his conceptualizing ability to that of Leonardo da Vinci. He attributes his success to "a unique chemistry that few people in America have. There are people who invent who don't understand what the market needs. I am able intuitively to refine existing ideas into products that solve problems."

More and more practitioners seem to agree with the philosophy that "Good ideas are a dime a dozen—it's what you do with them that counts."

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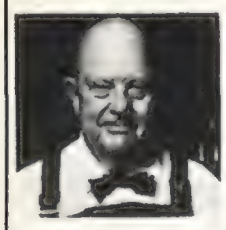

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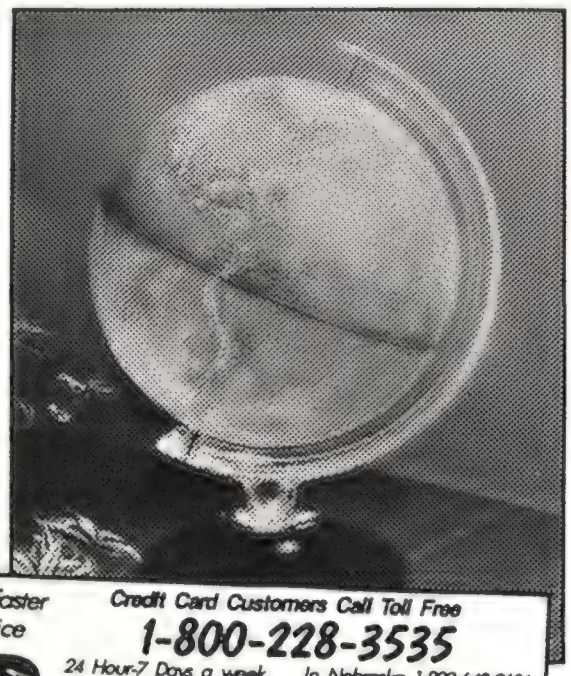

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David Bergstein, an art director at a large advertising agency in New York City, knows. About four and a half years ago, Bergstein and his wife missed out on some of the fun at a roller rink in Connecticut because they didn't have "disco lights"—a kind of fad flashlight. Out of that disappointment was kindled the inventive fire for "Skate Lightning."

"A couple of days later, it just came to me," says Bergstein. "Sparks! You gotta have sparks!" This is informally known as the "Eureka moment," harking back to the time when the Greek mathematician Archimedes, having solved a particularly vexing problem while taking a bath, supposedly ran naked through the streets of ancient Syracuse crying "Eureka!" —I have found it!

With no previous inventing experience, Bergstein promptly devised a mechanism that could fit onto the back of a skate and generate a tail of sparks. But it took a long time to find a manufacturer, and longer still to get into production. Three years ago, Bergstein thought he'd stumbled onto a gold mine. Now, 38 and philosophic, he is still waiting for that first big shipment from Taipei. "If this turns out to be a bad experience," he says, "I don't think I would do it again."

Other inventors don't even get as far as a manufacturer. Out in Newburg, Oregon, a feisty 69-year-old woman named Frances Gabe has been working for nearly a decade on the prototype for her "self-cleaning house." In St. Louis, former railroad employee Presley O. Barge has devised the ultimate mobile home, a spherical abode with retractable floats and helicopter blades on top. And in New York City, Igor Dmitrowsky hopes someday to see people plying the wild blue yonder over Queens in his jet-powered winged harnesses.

Farfetched? Maybe. But as any inventor will remind you, people laughed at the first steamboat, too. Inventors all seem to believe in a long-standing and cherished Ameri-

can conceit: just as anyone can grow up to be President, anyone can come up with an idea that will set the world on its ear. Unfortunately, it does not often work out that way. Take Polish émigré Mark Raczkowski, proud inventor of the self-making bed.

The 53-year-old Raczkowski once thought up a remote-control system for removing radioactive waste from a nuclear plant. (He worked at several such plants as a systems engineer.) It was not especially difficult for him, therefore, to figure out a mechanism that changes a sheet into a bedspread in ten seconds flat. It relies on rollers at the head and foot of a mattress, and a sheet and bedspread patched together with Velcro. "We have four billion people in the world," observes the Warsaw native. "Everyone has a bed. Why not an automatic bed?" But alas, no one has beaten a path to his Rockaway, New Jersey, door.

Not quite as farfetched is Walter Nold's latest invention. "It's just plain water!" he cries, but it is water with a difference. Nold, a Natick, Massachusetts, inventor who is recognized as an innovator in the field of geotechnical instrumentation, has concocted the Nold DeAerator, which looks like a glorified blender. It shears clusters of water molecules in a vacuum, removing gases and producing purified water that increases the efficiency of everything from instrument gauges to ultrasonic monitoring. Other devices do the same thing, but Nold's uses one-sixtieth the normal energy in one-twelfth the time. Nold often takes a nip of the stuff before bedtime to quell outbreaks of gasification in the stomach. He has sold more than 200 units (at $1,700 each) and his clients include Westinghouse Electric,

Entrepreneurial inventor Robert Vicino, who perched an inflated King Kong on the Empire State Building last year, strikes a pose before Kong's gigantic mouth.

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Skate Lightning! That's what New York adman Robert Bergstein calls his gizmo for generating a dramatic tail of sparks behind a roller skate.

Johnson & Johnson and numerous university labs.

Every inventor pays a price, and Nold, an excitably candid man, is willing to reveal the emotional toll. His self-absorption, he admits, crosses into selfishness. Frustration boils up like so many bubbles when he discusses someone who doesn't share his enthusiasm for degassed water. And he rues the effect inventing has had on his domestic life. "If I were an accountant," he says, "I'm sure my marital life would be happier."

There is another troublesome relationship that bothers many inventors —the marriage of an imperfect patent system (there is a backlog of 216,000 patent applications) with a system of justice that up to now has been largely nontechnical. In the view of independents, it is a system that most rewards those who can afford to sue. These are not new complaints. From Eli Whitney and his much-copied cotton gin to the fellow in Texas who invented the now-familiar string grass trimmer, the highway of progress is littered with heartbroken inventors who naively thought that their 17-year patents conferred inviolate protection on their ideas. If the economic promise of a particular invention is sufficiently high, it appears, it will probably generate lawsuits galore.

Gordon Gould, for example, was named "Inventor of the Year" in 1978 by the Association for the Advancement of Invention and Innovation on the basis of a 1977 patent that described a specific method for the operation of lasers. Yet that very same patent, and another one issued in 1979, are currently undergoing reexamination by the Patent Office as the result of a challenge by Control Laser Corporation, General Motors and AT&T. Litigation surrounding the patents, which had begun earlier, has been put on hold pending the outcome of the reexaminations. At stake in that litigation: royalties for Gould

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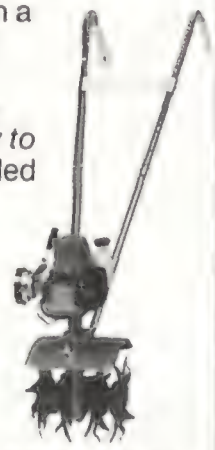

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and his partners that could amount to more than $10 million a year.

Back in 1957, when Gould was a graduate student at Columbia University, he sat bolt upright in bed one night with what he called "the most important discovery I would make in life." There is a notarized set of notes penned by Gould that same night which indicate, he contends, that he was the first to conceive the laser. But Gould didn't file for a patent right away and two other scientists who had also been working on the idea at the time—future Nobel Prize winners Charles H. Townes and Arthur L. Schawlow—received the first patent. They dispute Gould's claim; some others in the laser field support him. Twenty-five years and about $2 million in legal fees later, Gould, 63 and vice-president of a small optical communications firm in Gaithersburg, Maryland, is still trying to amend his original error of not filing for a patent immediately.

Lawyers and press agents, marketing men, judges—whatever happened to that crusty old seat-of-the-pants idea man, the solitary Yankee inventor? Well, with apologies to mythology, he is the son of an Italian coal miner, doesn't believe much in patents (though one of his earlier inventions goes up with each space shuttle flight), and is living on a 150-acre farm out in Grand Rapids, Ohio.

His name is Dominick Labino, and his workday usually begins around eight in the morning when, weather permitting, he gets out his 7-iron and whacks a golf ball from his house out to the workshop. The dogs, Jena and Eli, and Albert the cat, tag along, and so does his business manager, Libby, who is also his wife. If the ball perchance rolls into the workshop, it will probably disappear into what must be the world's largest industrial sand trap. Clutter has never been more magnificent.

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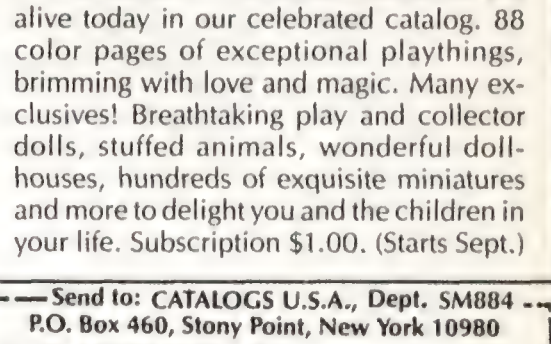

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ments, antique and modern, from heavy industrial lathes to a homemade pair of tongs used to make eyes for glass owls. There are four glowing furnaces, all running continuously at more than 2,100 degrees F; Labino uses them to support his research by making art glass. There are Rube Goldberglike gears and cams, connected with cord, that control timers and switches. There is a cast-iron bell, recycled from the engine block of a 1933 Studebaker—for the heck of it. And there is Labino, in his checked flannel shirt and Hush Puppies, 73 years of age, white hair tending to mane, a Missouri Meerschaum between his teeth, his glasses—as usual—migrating down his nose.

You could say he was born to invent. In 1929, as a 19-year-old future college dropout, he produced what he claimed to be the world's smallest motor—three-eighths of an inch high, .059 ounces in weight, and generating a walloping one-half gnatpower. He could put two of them into the shell of a hickory nut.

Bigger and better things followed. Labino built one of the four glass harmonicas still extant in the country; Ben Franklin built the first one. He has also built a glass carillon, a keyboard instrument that activates hammers, which in turn strike inverted, blue-tinted glass bowls tuned to different pitches.

There are other Labino projects: an instrument to measure the softening point of glass (recently patented and signed over to the American Ceramic Society); a homemade camera; new colors of glass; and new glass fibers, like the one he invented back in the 1950s which allowed development of the space shuttle's heat-resistant tiles. Paper, too, is a favorite. He's made sheets from wasps' nests, mulberry bark, algae, cattails, pampas grass and horse manure—the latter, one gathers, mostly for the amusement of having guests try to guess what it's made of as they rub it between their fingers.

Labino retired from the Johns-Manville Corporation in 1965 after heading a research lab for nearly 15 years. "A guy working alone in his basement is likelier to come up with something important," he insists, "than someone on a corporate team who has to go to meetings. The way to experiment is to get off the beaten track, get off the ends of the spectrum."

There is something basically anachronistic about Labino's brand of inventing. He confects secret formulas for glass, for example, in a home-rigged mixer that uses six croquet balls to break up clumps in the mixture. But there is also something quintessentially American in both his ingenuity and his outlook. A kindred spirit more to Franklin and Twain than to modern corporate scientists, Dominick Labino manages to combine two qualities in short supply these days, and not just in inventors: an instinctual kind of outlaw creativity, and a sense of humor. "I like to have fun," he admits. "My philosophy is: he who has the most toys wins."

To help pay for his inventing work, wizard Dominick Labino makes glass sculptures. Intricate tooling is done while the glass is still hot.

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Book reviews

Autobiographies; Vol. 1: *I Knock at the Door, Pictures in the Hallway, Drums Under the Windows*; Vol. 2: *Inishfallen, Fare Thee Well, Rose and Crown, Sunset and Evening Star*
Sean O'Casey
Carroll & Graf, $21.95 each/$10.95 each, paper

If Marcel Proust and James Joyce, after a few rounds of white wine and Guinness, had decided to co-author *Studs Lonigan*, they might have come up with a book rather like Sean O'Casey's six separate autobiographies. These books—first published between 1939 and 1954—not only take their sweet time in chronicling the playwright's life, but also demonstrate the kind of narrative potpourri we associate with *Ulysses*: O'Casey regales us with puns, street lingo, gushingly purple prose, bawdy escapades, allegories, political satire and constant Biblical allusion.

Such a brew will hardly be to everyone's taste. Yet for all the verbal drunkenness, O'Casey's *Autobiographies* stands—uneasily—as a considerable masterpiece, moving, shocking, fiercely *alive*.

Take this passage for proof. The "slum dramatist" has come to England after the riots over his then-controversial and now-classic play, *The Plough and the Stars*. One afternoon he meets the leading theater critic of the day:

"A little aside stood James Agate. . . . No grace in this man, in build, in face, in raiment; no power either. Heavy, clumsy-looking, but with a cleared brow, like a refined son of a refined Caliban. A complexion like faintly-ruddied lard; smooth skull, with diminishing eyebrows, and a mouth lower at one end than the other; small eyes, having in them neither glint of humour nor gleam of passion. Everything heavy about the man: the head seeming to press heavily on the shoulders, the trunk on the legs, the legs on the ground, and even the clothes he wore . . . seemed to ruffle stiffly when he moved, like a pliable suit of armour: the bulkiness was all."

This acid-etched portrait reveals several of O'Casey's attributes as a writer: the born rebel's frankness, an eye for killing detail ("a complexion like faintly-ruddied lard"), a fondness for overbuilding a paragraph, and the penchant for buried literary quotation (the nicely used Caliban reference, the leaden echo of Hamlet's "the readiness is all"). Above all, the prose—like the man himself—crackles with energy.

Sean O'Casey was born in 1880 into as desperate a life as can be imagined. His mother bore 13 children; only five lived to maturity, and two of these virtually died of malnutrition in middle age. Johnny Casside, as he was then known, didn't even begin to learn to read or write until he was in his early teens, then spent most of his life till the age of 40 first as a clerk, later as a common laborer.

To these civic disadvantages nature added ulcerated corneas, which required the daily application of a lotion to the insides of his eyelids, a mysterious numbness in his legs which doctors diagnosed as creeping paralysis, and periodic tubercular swellings on his neck. Somehow

Sean O'Casey, born rebel with an eye for "killing detail" in poet's language.

O'Casey, through innate drive and the heroic devotion of his mother, overcame these handicaps to make himself into an educated man and a 20th-century master of language.

His early autobiographical volumes celebrate a passion for reading, a roving eye for a well-shaped ankle, and regular politicking on behalf of Irish causes such as the Citizen Army and Jim Larkin's trade union movement. Many of the remembered scenes are as vivid as a movie, as perfectly written as poetry. When, for example, the adolescent Sean clasps a co-worker named Alice in his arms, the older O'Casey chooses just the right word for the wondrousness of first love: "The rustiness of life fled from him. . . ." Later on he recaptures the exhilaration of a political demonstration—and the terror of a mounted policeman viciously clubbing his way through a packed throng. From one such riot Sean escapes with a young woman he'd saved from being trampled and finds himself, to his delight, being seduced.

But any whimsy disappears before the depiction of a poverty that wears down everyone. Much of *I Knock at the Door* and *Pictures in the Hallway* spotlights Sean's mother, who worked tirelessly for decades, until one afternoon she lay down and quietly died. Her son, with greater power than splashy rhetoric could provide, titles that chapter "Mrs. Casside Takes a Holiday."

In his latter volumes, O'Casey makes a name for himself as a playwright (with *Juno and the Paycock*) and awkwardly hobnobs with A.E. (poet-painter-mystic George Russell), Lady Gregory and Yeats (who kept dozens of squawking canaries as pets). In the 1920s Sean falls out with the Abbey Theatre and moves to England, where he marries an English actress, fathers two sons and a daughter, becomes friends with Bernard Shaw and settles unrepentantly into fiery old age: "No man is so old as to believe he cannot live one more year."

Though this long autobiography can be hard slogging in places, Carroll & Graf deserves all praise for restoring it to print. These two omnibus volumes afford reading of a Dickensian—even Rabelaisian—richness, and one turns their last page with regret, exhilaration and, yes, relief.
Michael Dirda
Washington Post Book World

An American Procession
Alfred Kazin
Knopf, $18.95

It hardly seems possible that Alfred Kazin's expert and influential study of modern American prose literature, *On Native Grounds*, appeared as long ago as 1942. In the years since, Kazin has established himself among the ablest interpreters of our classic and contemporary writers. He now offers an ambitious and fascinating study whose premise is the shifting emphasis, during the century it surveys—1830 to 1930—from the revolutionary optimism of Ralph Waldo Emerson and his peers to the post-World War I vision of Americans' individual experience and their shared past as "an immense panorama of futility and anarchy."

Kazin begins with the image of historian—and historical pessimist—Henry Adams in old age, in 1918, brooding over the Great War's demonstration that the 19th century's transcendent idealism had been illusory. He was possessed by a vision of "history as the mere acceleration of mechanical forces, ending in their uncontrollable dispersion." Adams, whose work is later discussed in its chronological place, shadows the entire book: his elegant and cynical pejorative pronouncements on American culture are quoted again and again. They provide a sardonic counterweight to the great expectations which had begun this hopeful century.

Emerson is seen as a "sage-at-large" preaching liberation from inherited cultural absolutes and religious orthodoxies, an enthusiast who acknowledged no limits to our inherent human powers. Kazin next examines Thoreau's penchant for "putting the highest possible value on himself rather than on the State," and Whitman's buoyant self-worship (darkened by his experience of civil war and intimations of chronic national disunity).

Subsequent chapters show how later writers fell further away from that fine flush of Emersonian idealism. Kazin keenly evokes Hawthorne's "sense of the *unreality* of existence" and Poe's revelations of the mystery and terror at the heart of things. He discusses Melville's intuitive focus on "Western man in confrontation . . . with the primitive in society, the elemental in nature"; Emily Dickinson's solipsistic irony; Henry James' "lonely, fundamentally unreward-

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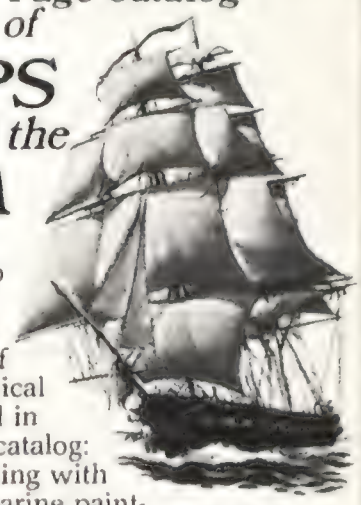

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ed devotion to art"; Theodore Dreiser's bitter portrayals of "man as the dupe of society"; Stephen Crane's impressionistic dramatizations of "man's ultimate helplessness and loneliness."

He moves on to analyze "the anxious preoccupation with style" emergent in the 1920s in the poetry of Pound and Eliot, and the fiction of that saturnine elegist William Faulkner and of "Hemingway the Painter" (the title of Kazin's chapter on Hemingway). A final retrospective chapter examines the writer's experience of displacement from his culture in John Dos Passos' self-exile to Europe and F. Scott Fitzgerald's escape into his own romantic fantasies.

Though it traces a devolution away from spiritual consensus, the book is not dispiriting, nor do we ever feel a pattern needlessly imposed on the refreshing individual readings that are its core. Kazin's style is dependably flexible and eloquent, often witty ("Emerson was always to have a positive effect on people who did not know what he was talking about"), and easily accommodates revealing incidental perceptions (such as the information that Thoreau's eventually fatal lung disease was exacerbated by "the graphite he inhaled when making pencils").

The single finest section may well be Kazin's telling analysis of Mark Twain's literary strategies and personal character, extending to include piquant contrasts with Twain's friendly admirer William Dean Howells and his great opposite Henry James, and also a truly revisionist reading of *The Adventures of Tom Sawyer*. But it is only one of the riches to be found in this authoritative and brilliant book, which seems to me the finest work of Kazin's distinguished career.

Bruce Allen
Literary critic

The Ledge Between the Streams
Ved Mehta
Norton, $17.50

When Ved Mehta set out to write the autobiographical series of which this is the fourth volume, he had in mind a major body of work quite unlike anything we have in literature today. It would be too limiting to regard him primarily as a blind writer or an Indian writer, but being both blind and Indian gives him a special perspective on the extraordinary events that shaped his childhood.

The Ledge Between the Streams covers the period from the early 1940s to 1949, when Mehta was 15, years that straddle India's tragic beginnings as an independent nation. Through his recollections of conversations, smells, sounds and textures, we "see" the India of his boyhood more clearly than if we had looked at it through our own eyes.

The book's title comes from an incident that occurred on a family expedition to Kashmir. During a rest stop, the young Vedi persuaded his kin to go with him to inspect two streams that ran side by side at the bottom of a deep gully. One stream was local, warm and muddy; the other, which came from the mountains, was cold and clear. As they stood on the narrow strip of land between the streams, a cloudburst in the mountains sent a wall of water hurtling down the gully upon them, and they barely escaped.

The incident was symbolic of the circumstances of Vedi's life. His family, caught in the bloody religious strife that accompanied the partition of India, was forced finally to abandon their house and belongings and flee to the Hindu side of the border.

The ledge also is symbolic on a more personal level. Encouraged by an ambitious, intelligent father, and held back by a superstitious, overly protective mother, Vedi persisted in his quest for an education in the complicated, often inhospitable world outside his family.

In simple language sparsely adorned, Mehta chronicles the struggle of an imaginative and intelligent child to fulfill his potential against great odds. The struggle seems at times an impossible one, for the India of his youth was poor and disorganized, with virtually no provisions for helping handicapped people to lead normal lives. But Vedi wanted more than anything to escape "the edge of the fire circle," where he sat idle while members of his family read or worked with their hands, and he stubbornly refused to give in to those who viewed his blindness as an effective obstacle.

When Vedi asked his sisters and brother if he could go to school with them, his brother, Om, replied, "You're blind." It was a response he heard often as a child. But instead of giving up, Vedi responded by using a skill he had developed on an earlier occasion when he was told he couldn't participate. He followed his sisters to school on his bicycle, tracking the sound of their voices through the traffic.

Mehta's recollections of living with his Hindu family in a Moslem city on fire with religious and political hatred are chilling. He remembers a Moslem mob rampaging through the streets in search of Hindus as sounding like "the roar of a hungry tiger, pacing to and fro."

When it became too dangerous to stay, Vedi, who was 13, fled by train with his sisters and cousins. Just before he left he learned that his friend Sohan, a Hindu activist, had been killed. His departure from Lahore is haunted by this mournful, horrifying image: " 'Sohan is dead, clackety-clack, Sohan is dead, clackety-clack,' the wheels of the train to Bombay repeated like some relentless dirge. . . ."

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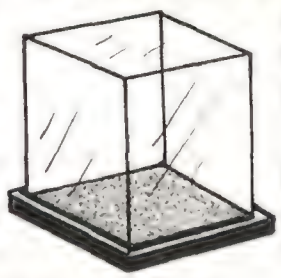

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This is the last month to enjoy the extended evening hours at Mall museums (NASM open until 9 P.M., and HM&SG, NMAH, NMNH and the castle open until 7:30 P.M.). With the end of Labor Day weekend, on September 4, these museums will all close at 5:30 P.M.

Special August exhibits and events

National Air and Space Museum
The Administrators of NASA (opens August 15) New exhibit unit in the Apollo to the Moon gallery.
The Medicean Stars (August 4, 9 A.M.) Monthly sky lecture.

Freer Gallery of Art
James McNeill Whistler at the Freer Gallery of Art (through December 1).

National Museum of Natural History
Treasures From the Shanghai Museum: 6,000 Years of Chinese Art (August 11-November 30) Bronzes, jades, porcelains, sculptures; 323 objects in all.
Chinese Art: Of Heaven, Earth and Man (August 24; noon; Baird Auditorium) Film on art history since 1500 B.C.

National Museum of American History
Yesterday's Tomorrows: Past Visions of the American Future (August 7-September 30) History of popular expectations from late 19th century.

Cooper-Hewitt Museum (New York)
Design in the Service of Tea (August 7-October 28) Focuses on designs for the Western market.
Cut Paper (August 7-October 28) Eighty examples from around the world.

National Museum of African Art
Patterns and Forms in African Art (August 21-September 16) Thirty works.
African Mankala (through October 7) Gameboards and related objects.

National Portrait Gallery
The Man from Indiana: Booth Tarkington, 1869-1946 (through December 16).
Erastus Salisbury Field: 1805-1900 (through September 4; see page 60).

National Museum of American Art
Erastus Salisbury Field: 1805-1900 (through September 4; see page 60).
Fantasy and Imagination: Sculpture by Eugenie Gershoy (through January 20).

Hirshhorn Museum & Sculpture Garden
Conservation of Modern Art (through September 3) Exhibit outlines the treatment and resurrection of 20 works of art.
Artistic Collaboration in the 20th Century (through August 19).

Exhibition catalogs

Catalogs available at this time include:
Wood Works: Constructions by Robert Indiana (paper, $6.50)
Advancing American Art: Politics and Aesthetics in the U.S. State Department Exhibition, 1946-1948 (paper, $12)
Raised in Clay (paper, $19.95; cloth, $39.95)
Yesterday's Tomorrows: Past Visions of the American Future (paper, $7.95; cloth, $29.95)
Treasures From the Shanghai Museum (paper, $10.95)

To order, send check or money order to: Museum Shops, Box 44083, Washington, D.C. 20026-0083. Include 15 percent of total purchase to cover postage and handling (minimum, $1.75).

Smithsonian on the air

Radio Smithsonian: Topics on this weekly half-hour program include Whipple Observatory and the 1984 Folklife Festival.
Smithsonian Galaxy: Short radio features.
Here at the Smithsonian . . .: Two-minute TV features include a look at Roger Tory Peterson and the Smithsonian's political collection.
Smithsonian World: hour-long TV special on PBS, August 1, "Speaking Without Words."

To find out what stations in your area carry these programs, write: Office of Telecommunications, C222B, Smithsonian, Washington, D.C. 20560.

Resident Associate events

To become a Resident Associate, or to find out about the many other activities presented monthly, or for fee and ticket information, call 357-3030. Here are some August events:

Central Traditional Orchestra of China (August 11; 8 P.M.) Compositions will include music from the Beijing Opera.
Washington Dixieland All-Stars—Courtyard Concert (August 15; 7 P.M.) Bring light supper to NMAA/NPG courtyard.
Dutch Film Treat (August 15, 22; 7 P.M.) Two recent epics—*Max Havelaar* and *Soldier of Orange*.
Simone de Beauvoir (August 16; 7:30 P.M.) Documentary film.
Shakespeare on Film (Six Tuesday evenings beginning August 21; 7:30 P.M.) Films inspired by Shakespeare plays.
Indonesia's Ancient Borobudur (August 27; 6 P.M.) Slide lecture by W. Morton Brown III.
Elegance and Enigma: The Drawings and Paintings of Watteau (August 29; 8 P.M.) Lecture by Margaret Morgan Grasselli.

Smithsonian Institution Traveling Exhibition Service

SITES circulates exhibitions to hundreds of cities outside Washington. To sponsor a show in your community, write: SITES, Smithsonian, Washington, D.C. 20560. Here are some August exhibits:
Colorado Springs (August 4-September 16) *Assignment: Aviation—Paintings from the Stuart M. Speiser Photo-Realist Collection*, Fine Arts Center.
Madison, Georgia (August 4-September 2) *Upland Game Birds of North America*, Madison-Morgan Cultural Center.
Fort Scott, Kansas (August 18-September 16) *The Tallgrass Prairie: An American Landscape*, Fort Scott National Historic Site.
Auburn, New York (August 4-October 21) *China From Within*, Schweinfurth Memorial Art Center.

Membership benefits when visiting the Smithsonian

Begin your visit at the Associates' Reception Desk in the original Smithsonian Institution Building, the castle. The cordial welcome includes special printed materials and full details about your benefits: dining in The Court; discounts in most Smithsonian shops; and a slide/lecture orientation to the 13 museums and the Zoo. The Reception Desk is staffed daily from 10 A.M. to 4 P.M.

Add to the pleasure of your visit by planning ahead: a fact-filled previsit packet is free; send postcard request or phone Associates' Reception Center, Smithsonian Institution, Washington, D.C. 20560, (202) 357-2700; for hearing impaired, TDD (202) 357-1729. Allow two weeks for receipt.

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The Edinburgh International Festival

This month, people are going from all over the world to the Edinburgh International Festival, a cultural celebration being held from August 12 through September 1. It is a three-week-long party filled with a cornucopia of exhibitions and events including opera, musical theater and ballet—as well as a kite-flying festival and the nightly military tattoo.

For Associates who attend the Festival, there will be a special reason to be proud: the Smithsonian will be strongly represented there, with both a major exhibition of significant objects from its collections and a rich sampling of musical performances. For details on the exhibit, "Treasures From the Smithsonian Institution," and the performing groups the Smithsonian is sending, see *Highlights continued,* page 136. Here are some of the other outstanding attractions at this year's Edinburgh International Festival:

Opera performances

Washington Opera performing Gian Carlo Menotti's *The Telephone* and *The Medium*—conducted by Lorenzo Muti, directed by Gian Carlo Menotti (August 12-16).

Scottish Opera performing Pier Francesco Cavalli's *Orion*—conducted by Raymond Leppard, directed by Peter Wood (August 21, 23, 25).

The Children's Music Theatre of Edinburgh performing *The Tower of Babel* (August 25-September 1).

Ballet performances

Paris Opera Ballet, directed by Rudolf Nureyev, will perform a program of three ballets: "Harlequin, Magician of Love" (choreography, Ivo Cramer); "Carnaval" (choreography, Michel Fokine); "Le Bourgeois Gentilhomme" (choreography, George Balanchine); Rudolf Nureyev will dance at every performance (August 29-September 1).

Komische Opernballet, Berlin, will perform "Swan Lake"; choreography and production by Tom Schilling (August 23-25).

Theater

Sarah et le Cri de la Langouste, with Delphine Seyrig and Georges Wilson (August 14-18).

Twice Around the Park, an award-winning Broadway play with Anne Jackson and Eli Wallach (August 15, 17, 18).

A Soldier's Tale, an off-Broadway, Pulit-

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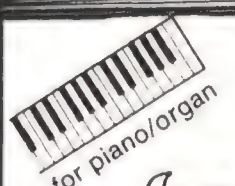

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zer Prize-winning play presented by the Negro Ensemble Company (August 27-September 1).
New Plays by Samuel Beckett, presented by the off-off Broadway Harold Clurman Theatre, directed by Alan Schneider (August 13-25).

Orchestral concerts

Philharmonia Orchestra (August 12, 14, 15) Opening concert: Rossini's *Stabat Mater.*
Scottish National Orchestra (August 13, 21; September 1).
BBC Symphony Orchestra (August 22, 23).
Boston Symphony Orchestra (August 26, 27) Directed by Seiji Ozawa.

Chamber music and recitals

Orlando Quartet (August 14, 16).
Salvatore Accardo, violinist (August 15).
Moscow Virtuosi (August 16, 18).
Irina Arkhipova, mezzo-soprano (August 17).
Krystian Zimerman, piano (August 19).
Dietrich Fischer-Dieskau, baritone (August 19).
Yo Yo Ma, cellist (August 25, 28).
Eduardo Fernandez, guitarist (August 26).
Ensemble of the Twentieth Century—composed of principals from the Vienna Philharmonic (August 21, 23).
Salomon Quartet—the only string quartet in Britain specializing in music of the 18th century played on period instruments (August 22).
London Brass Virtuosi (August 24).
Heinz Hollinger, oboist (August 27).

Special concerts

Hoffnung Festival—a concert of symphonic caricature by the Scottish National Orchestra (August 24).
Festival Fireworks Concert—a late-night, open-air concert by the Scottish Chamber Orchestra, playing Handel's *Music for the Royal Fireworks* to the accompaniment of a fireworks display (August 23).

Exhibitions

Eduardo Paolozzi, sculptor and graphic artist (August 11-September 9 at the Royal Scottish Academy).
Chinese Watercolors—the Arthur M. Sackler Collection of Chinese Watercolors (August 12-September 1 at Upper Library, Old College).
Sculpture of Henri Matisse—60 bronzes ranging in size from tiny medallions to the monumental sequence of "The Backs" (August 5-September 15 at City Art Centre).

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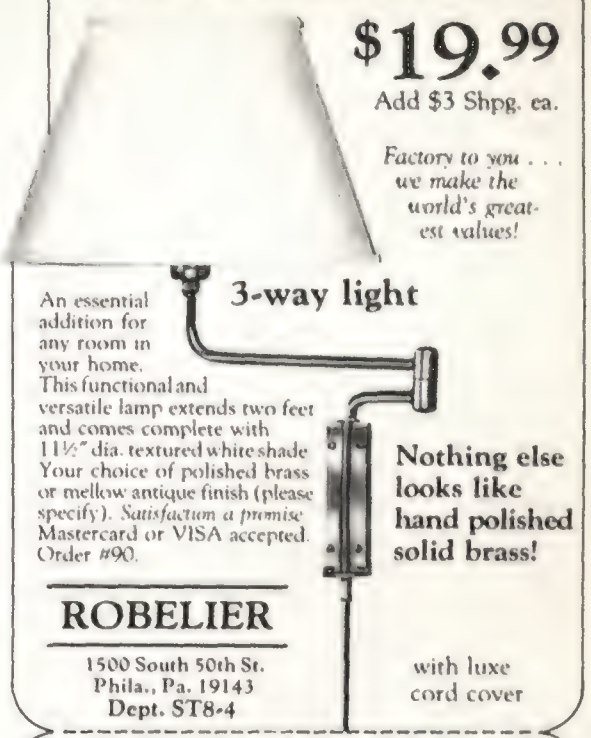

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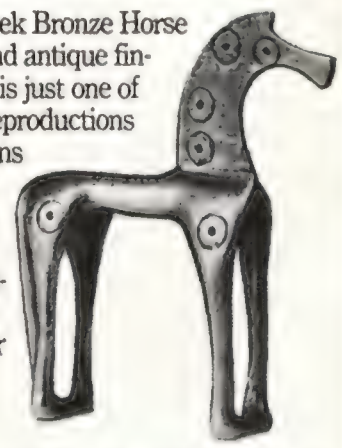

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Smithsonian goes to Edinburgh

The Institution is sending treasures to this year's Festival—they'll fill both exhibit areas and music halls

If you are among the Associates lucky enough to be traveling in Europe this summer, be sure to include the Edinburgh International Festival on your itinerary. Not only will you see some of the world's greatest opera, theater, concert music and ballet (see page 134), but you will also discover an exhibition that is the next best thing to visiting the Smithsonian itself. "Treasures From the Smithsonian Institution," which will be on view from August 12 through November 4, is just what its title says. From nine museums, 250 objects, every one selected for its cultural significance to American history, have been brought together under the same roof—in this case, the roof of the Royal Scottish Museum.

To outdo itself, however, the Smithsonian is also sending treasures of a different kind—the kind that *raise* the roof. These are the musicians who embody the richness and variety of American traditions.

First to perform will be the Smithsonian Chamber Players (August 13-15), who have researched Baroque and early Classical performance practices. They will be followed by Sweet Honey in the Rock, an a cappella black women's quintet (August 17-22), and by some sizzling jazz sessions with the Modern Jazz Quartet and pianists Tommy Flanagan and Barry Harris (August 17-21). Finally, our folk heritage will be celebrated when the stage is shared by Appalachian balladeer Cas Wallin: Lawrence Eller and Friends, a string band from Georgia; Beausoleil, a Cajun band from Louisiana; and songster Mike Seeger (August 22-27).

To round out the Smithsonian's roster of events at the Festival, there will also be two symposia, open to the public, at the Royal Scottish Museum. In the first, on August 10, Secretary Ripley and seven museum directors will discuss the various collections and interests of the Institution. The second, on August 13, will cover the scientific past of the United States and Great Britain from 1750 to 1850.
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Along the Bozeman Trail August 18-25: Trace this famous route through Montana and Wyoming to Custer Battlefield, a Crow Indian Fair and Yellowstone National Park.

Jackson Hole August 26-September 2: Discover the Old West at Red Rock Ranch with trail rides and hikes in the Tetons.

New England Seaports September 13-23: Visit Nantucket, Martha's Vineyard and Newport to trace the history of the great seafaring era.

Pueblo Indians and Spanish Villages of New Mexico September 30-October 8: Visit craftsmen, museums and private collections in Santa Fe, Taos and Albuquerque.

Opera in New York October 18-21 or November 8-11: Attend performances and tour behind the scenes with an opera soloist.

Delta Queen October 18-26: Visit the World's Fair in New Orleans before steaming up the Mississippi to Memphis.

LA in Style November 12-18: Discover exciting new art and architecture in Los Angeles and Santa Barbara. Visit museums, studios and private collections.

Everglades December 3-9: Observe birds and flowering plants while canoeing along the Ten Thousand Islands estuaries.

Christmas at the Smithsonian December 7-9: Welcome the holidays with a gala tree-trimming party in the castle and special tours of the museums.

Hawaii January 20-February 2 or February 17-March 5: Hike and camp on three of these enchanted Pacific islands.

Coming in February: Two of our longtime favorites, Yellowstone in Snow and Baja Whale Watch.

Arizona in Spring April 9-17 or April 11-19: Travel by van from Tucson to explore the beauty of the Sonoran Desert, Madera Canyon and Chiricahua Mountains.

Washington "Anytime Weekend": Celebrate the end of summer with a family weekend at the Smithsonian. Package includes hotels, meals and exclusive tour of the castle on the Mall. Reservation and payment must be received at least ten days prior to arrival.

Foreign Study Tours

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People's Republic of China, 1984: Exclusive tours to a variety of destinations are led by a Sinologist and include intensive pretour briefing.

Kenya August 9-26: Exciting wildlife safari to east Africa when the wildebeests are migrating through the Masai.

Odyssey of Flight September 4-18: National Air and Space Museum experts lead a grand tour of aviation-related activities in England, Germany and Switzerland. Includes the Farnborough International Aerospace Exhibition.

Gulf Islands September 6-12 or 13-19: Cruise between Vancouver and Victoria, British Columbia, on a 68-foot sailboat. Learn about the area's natural history, observe killer whales.

Oxford/Smithsonian Seminar September 14-29: Attend classes led by Oxford faculty and explore this famous university town.

The Ancient World of Peru September 29-October 14: Visit Lima, Cuzco, Indian markets and amazing Machu Picchu.

Egypt and the Nile September 30-October 19: Voyage from Cairo aboard a chartered riverboat to impressive historic sites.

Canals and Countryside October 1-12: Cruise through English and Welsh waterways on famous canals, experience the working of locks and explore picturesque inland towns and villages.

Istanbul and Beyond October 7-21: Discover the lure of ancient Istanbul and Ankara and the vitality of modern Turkey. Includes excursions to little-known Anatolian cities, the storied land of Troy or Greco-Roman ruins near the Mediterranean.

Classical Greece October 13-24: Sail to the Aegean islands and visit the grand sites of antiquity on the mainland.

Bahamas October 26-November 7: A Caribbean adventure combines five days on Andros Island and three days sailing around the Berry Islands.

Mexico & El Tajín November 23-December 5, January 11-23 or March 22-April 3: Sample the rich, diverse cultures in and around Mexico City and Veracruz.

Yucatán Adventure January 17-29 or February 14-26: From Mérida, tour extraordinary Maya ruins in the company of a pre-Columbian archaeologist.

Zapotec & Maya Mexico January 31-February 12 or February 28-March 12: Discover the archaeology and colonial cities of Oaxaca, San Cristóbal de las Casas and Uxmal, traveling from highland to rain forest to the Yucatán peninsula.

The Atlantic Crossing December 6-21: A sailing adventure from the Canary Islands to Martinique on the square-rigged, four-masted *Sea Cloud*.

Year-End Holidays

Pacific Coast of Mexico December 21-30: Colorful tropical birds and fish highlight sailing and snorkeling adventure between Puerto Vallarta and Mazatlán.

Christmas in Austria December 21-January 3: Enjoy the many cultural attractions of Salzburg and Vienna during the height of the holiday season.

Christmas in Canterbury December 22-January 3: Old-fashioned Dickens Yuletide: services, Becket's cathedral.

Indian Wildlife Safari January 25-February 21: Travel by elephant and jeep to observe rare species of birds and animals in exotic India and southern Nepal.

Coming in February: New Zealand and the Milford Track.

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Digging Up Rome October 14-19: Well-known authorities on the art, architecture and fauna of the classical world use archaeological finds, eyewitness accounts and numerous slides and films to examine the art and daily life of this vibrant city at the time when all roads led there.

Aircraft Restoration: How To October 21-25: The master craftsmen of the National Air and Space Museum share their many techniques in workshops at the Paul E. Garber Facility (Silver Hill, Maryland).

Genealogical Research October 21-26: Taught by Milton Rubincam, Marilyn Duncan and other authorities, participants learn how to conduct research in major genealogical repositories.

Connoisseurship of Chinese Art November 4-9: Expert Shirley H. Ganse lectures on fine Chinese decorative arts and paintings in private and public collections, developing an eye for the best in terms of style and technique and detection of copies and forgeries. Includes private guided tour before public hours of the acclaimed exhibition, "Treasures from the Shanghai Museum—6,000 Years of Chinese Art," featuring hundreds of objects never before seen in the United States.

Golden Age of the Aztecs November 11-16: A popular pre-Columbian expert sheds the latest light on one of the great epics of history—the rise and fall of the complex Aztec civilization—in lavishly illustrated lectures and tours of a famous collection. Includes ancient masterpieces of art and architecture, recent important archaeological excavations in Mexico and a special guided tour of the outstanding pre-Columbian collection of 400 items at Dumbarton Oaks, Harvard University's renowned research center.

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By Richard Wolkomir

These days animals are talking like E. F. Hutton

Vice President George Bush's cocker spaniel, C. Fred Bush, has published his first book, *C. Fred's Story*, and it's a shot in the arm for all of us who rap with our pets. Like most celebrity autobiographies, it's an as-told-to, dictated to the Vice President's wife, Barbara. And it has all enthusiasts of animal-human dialogue applauding or, depending on species, wagging their tails and barking.

It seems that whenever C. Fred's picture appeared in the papers, people wrote to him. Mrs. Bush would type up his replies and mail them off, with a book the natural next step.

C. Fred's communicativeness may seem mystifying. But pet owners know animals have an eloquent vocabulary of yawns, yips, wags, whines, scratches, back rolls and withering glares when dinner is late. Interpreting these signals, owners can speak for their pets.

We had a typical exchange last evening with our own black mongrel, Sam, when he arrived in the kitchen after a long snooze in the sun room. It went like this—

Husband: Sam wants you to feed him.

Wife: Not at all. He's looking at you and wagging his tail. He says he wants *you* to feed him.

Husband: Sam says it's my turn to cook dinner, so it's only fair you open his can.

Wife: Sam says I fed him yesterday.

Husband (opening can): Sam says you can always tell your real friends.

Sam: Woof!

Sam, incidentally, addresses all adult humans as "Mr." or "Mrs.," as in "Sam says, 'Hello, Mr. Porter—is that Spot I smell on your knee?' " But a large malamute of my acquaintance, Tonto, who shares digs with a young attorney named Andy, is on a first-name basis with everyone. The other day his owner and I walked into the house and Tonto woofed, which I was told meant: "Hi, Andy—want to see me do my tricks?"

All this, to skeptics, is just so much back-fence yowling. As Bertrand Russell once sniffed: "No matter how eloquently a dog may bark, he cannot tell you that his parents were poor but honest." True. Gazing deeply into the brown eyes of your English setter, you can only guess what is going on in there. It might be a canine version of "How do I love thee? Let me count the ways." But then it might be merely some dim, inchoate yearning for Ken-L Ration.

Yet, people who palaver with their pets are not dotty exceptions. A Utah State University study reveals that 90 percent of all pet owners regularly chat with their dogs, cats and birds. And 73 percent are convinced their pets talk back. Nor is the notion of such dialogue devoid of scientific backing. Biologists at Dartmouth College and the University of Washington have discovered that even willows and maples send warning signals to grovemates with airborne chemicals when they are under caterpillar attack. If mere plants communicate, can animals be mute? In fact, a number of biologists believe that the lower orders may be almost as gabby as we are.

Ants, for instance, gesture to assign hill-keeping chores. Honeybees direct hivemates to nectar-rich flowers by performing a hexapodal tap dance. And University of California ethologists say African vervet monkeys have wordlike warning cries—one scream means "snake," another "eagle."

At Purdue University, biologist Irene Pepperberg is studying a gray parrot that can count and identify colors. In his book *Non-Human Thought*, Jacques Graven tells of another gray parrot, Jaco, who lived in Salzburg from 1827 to 1854. He greeted visitors in the morning with "Good day," and in the afternoon with "Good afternoon." When his master went out, Jaco would say, "God be with you." When Jaco's owner brought home a bird and it sang for the first time, Jaco turned to it and said kindly, "Bravo, little one, bravo."

Another famous parrot, Coco, would declare: "Coco wants to and must eat now!" Once an old major tried to teach Coco tricks, saying, "Get up on the perch, Coco." After a disgusted silence, Coco guffawed and said: "Major, up on the perch, Major!"

Scientists have spent whole careers trying to talk to dolphins, patiently teaching sign language to apes. Perhaps impelled by the loneliness of Man's long evolutionary voyage, they seek an encouraging word from the kin we left behind, confabulating with the likes of "Nim Chimpsky," an educated chimpanzee researchers optimistically named after Harvard's leading linguistics expert. Trained simians, though in some ways the most gifted, do not always have smooth conversational sailing, however. An Atlanta chimp, Lana, confronted with her first cucumber, signaled: "Banana which is green." But psychologist Francine Patterson encouragingly reports that *her* pupil, Koko, a gorilla, can be disconcertingly human: "She loves an argument, and . . . will lie her way out of a jam."

Now I wish Dr. Patterson would talk to my dog, Sam. Every night he barks for 11 minutes at the potted cactus in the dining room, and I'd darned well like to know what he's saying.

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